Code of practice on safety and health in forestry work (revised version of the 1998 code of practice)*

Meeting of Experts to update and adopt the 1998 code of practice on safety and health in forestry work
(Geneva, 13–17 May 2024)

Sectoral Policies Department
Geneva, 2024

* In accordance with established procedures, the code of practice will be submitted to the 352nd Session (October–November 2024) of the Governing Body of the ILO for its consideration.
Sectoral codes of practice

ILO sectoral codes of practice are reference tools setting out principles that can be reflected in the design and implementation of policies, strategies, programmes, legislation, administrative measures and social dialogue mechanisms, in particular economic sectors or clusters of sectors. Sectoral codes of practice are adopted by meetings of experts comprising governments, employers and workers. They can be implemented progressively to take into account different national settings, cultures, and social, economic, environmental and political contexts.

Sectoral codes of practice draw their principles from the ILO’s international labour standards (Conventions, Protocols and Recommendations) and other sources, including Declarations, codes of practice and other policy guidance adopted and endorsed by the International Labour Conference or the Governing Body of the International Labour Office. They also draw on other international agreements and policy in the sector concerned, as well as on relevant trends and developments in regional and national law and practice.

Sectoral codes of practice focus on the issues that are priorities for governments, employers and workers, and that are unique to particular economic sectors and industries. While international labour standards normally deal with more general principles of labour law and practice, sectoral codes of practice specify the principles and processes that could be implemented to promote decent work in particular workplaces or contexts. They benefit from the expertise of practitioners in the relevant sectors to capture good industry practices and innovations.

Sectoral codes of practice are not legally binding. They are not subject to ratification or supervisory mechanisms established under the ILO’s international labour standards. Sectoral codes of practice can therefore be aspirational in scope and expand on principles laid down in international labour standards and other international agreements and policy, all the while recognizing that they can be adapted to different national systems and circumstances. As such, ILO standards and other tools or guidance adopted and endorsed by the International Labour Conference and/or the Governing Body form the foundation on which sectoral codes of practice build further. It is therefore understood that sectoral codes of practice are based on the full principles, rights, and obligations set out in international labour standards, and nothing set out in these codes of practice should be understood as lowering such standards.
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<td>all-terrain vehicle</td>
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<td>FOPS</td>
<td>falling object protective structure</td>
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<td>ILO</td>
<td>International Labour Organization</td>
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<td>OPS</td>
<td>operator protective structure</td>
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<td>occupational safety and health</td>
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<td>personal protective equipment</td>
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<td>ROPS</td>
<td>roll-over protective structure</td>
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In this code, the following terms have the meanings hereby assigned to them:

*Adequate, appropriate or suitable* are used to describe qualitatively or quantitatively the means or method used to protect the worker.

*Compensation:* A payment made to an injured worker or a worker suffering from occupational diseases to make up for the loss of earnings resulting from an occupational injury or disease, as well as the costs of the medical and related care necessary to maintain, improve and restore the health of the injured worker, as prescribed in the Employment Injury Benefits Convention, 1964 [Schedule I amended in 1980] (No. 121).

*Competence:* Having the necessary skills, knowledge, experience and training (and, if they are an organization, the organizational capability) to fulfil the role or task that they have appointed to undertake.

*Competent authority:* A ministry, government department or other public authority with the power to issue regulations, orders or other instructions having the force of law and enforce them.

*Competent person:* A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

*Contractor:* A person or enterprise providing services to an employer in accordance with national laws and regulations, or with agreed specifications, terms and conditions. For the purpose of this code contractors include subcontractors.

*Dangerous occurrence:* A readily identifiable event as defined under national laws and regulations, with potential to cause an injury or disease to persons at work or the general public.

*Employer:* (a) Any physical or legal person who employs one or more workers in forestry; and (b) as the context requires, the principal contractor, the contractor or the subcontractor.

*Forestry operation:* An activity where work is done in relation to forestry including but not limited to the establishment and regeneration of forests, silvicultural work, forest protection, restoration, timber harvesting, transportation and fire management.

*Hazard:* The inherent potential to cause injury or damage to people’s health.

*Ill health:* Any illness caused by or related to an exposure to risk factors arising from work activity.

*Incident:* An unsafe occurrence arising out of or in the course of work where no personal injury is caused. Also “near miss”.

*Inclement weather:* A condition caused by adverse climatic factors such as extreme heat, extreme cold, wildfires, floods, heavy rain, strong winds, ice and/or snow or thunderstorms which may lead to accidents or acute ill health, unless work is suspended or, where applicable, appropriate mitigation measures are implemented to allow safe operations.

*Joint safety and health committee:* A committee with workers’ representation at least equal to that of employers’ representatives.
Labour inspection: The periodic and structured or unannounced examination of a worksite by a person employed by a competent authority with a specialized knowledge of typical forest operation and the statutory and non-statutory requirements relevant to occupational safety and health.

Manager: A person appointed and legally responsible for the management and technical direction of all or part of a forestry enterprise.

Occupational accident: An unexpected and unplanned occurrence, including acts of violence, arising out of, or in connection with, work which results in one or more workers incurring a personal injury or death; may include commuting accidents, as prescribed in the national legislation.

Occupational disease: Any disease contracted as a result of an exposure to risk factors arising from work activity.

Occupational health services: Services entrusted with essentially preventive functions and responsible for advising the employer, the workers and their representatives at the worksite on the requirements for establishing and maintaining a safe and healthy working environment, which will facilitate optimal physical and mental health in relation to work, and on the adaptation of work to the capabilities of workers in the light of their state of physical and mental health.

Occupational injury: Any personal injury, disease or death resulting from a work accident or an occupational disease.

Occupational safety and health (OSH) management system: A set of interrelated or interacting measures to establish OSH policy and objectives and to achieve those objectives.

Personal protective equipment (PPE): Any device or appliance to be worn or used by an individual for protection against one or more health and safety hazards.

Recording: A procedure, specified in national laws and regulations, for ensuring that the employer or self-employed person maintains information on occupational accidents, occupational diseases and, as appropriate, dangerous occurrences, commuting accidents and suspected cases of occupational diseases.

Reporting: A procedure, specified by the employer in accordance with national laws and regulations and with the practice at the enterprise, for the submission by workers to their immediate supervisor, the competent person, or any other specified person or body, of information on: the notification of occupational accidents, occupational diseases and, as appropriate, dangerous occurrences, commuting accidents and suspected cases of occupational diseases.

Risk: A combination of the likelihood of an occurrence of a hazardous event and the severity of injury or damage to the health of people caused by this event.

Risk assessment: The process of evaluating the risks to safety and health arising from hazards at work.

Safety and health officer: A person with sufficient skills, knowledge and experience who assists employers and workers in assessing, designing, planning and implementing safety and health activities and helps maintain an effective OSH management system.

Sentinel health events: Designed to identify high-risk jobs and activities with regard to occupational health as well as to provide pointers towards the aetiology of diseases.

Supervisor: A competent person tasked with the day-to-day planning, organization and control of a forest operation.

Worker: In the context of this code, any person engaged in forestry.
Worker representative: In accordance with the Workers’ Representatives Convention, 1971 (No. 135), any person who is recognized as such by national law or practice, whether they are:

(a) trade union representatives, namely, representatives designated or elected by trade unions or by members of such unions; or

(b) elected representatives, namely, representatives who are freely elected by the workers of the enterprise in accordance with provisions of national laws or regulations or of collective agreements, and whose functions do not include activities which are recognized as the exclusive prerogative of trade unions in the country concerned.

Workplace: All places where workers need to be or to go by reason of their work including accommodation and welfare facilities and which are under the control of an employer as defined in “employer”.
Introduction

1. The ILO Declaration on Fundamental Principles and Rights at Work (1998), as amended in 2022, includes a safe and healthy working environment as one of its five principles, with the Occupational Safety and Health Convention, 1981 (No. 155), and the Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187), considered as fundamental Conventions. A sustainable future for forestry work with a safe and healthy working environment requires the active participation of governments, employers and workers through a system of defined rights, responsibilities and duties, as well as through social dialogue and cooperation.

2. In accordance with a decision taken by the Governing Body of the International Labour Office at its 348th Session in June 2023, a Meeting of Experts to update and adopt the 1998 ILO code of practice on safety and health in forestry work was convened in Geneva from 13 to 17 May 2024.

3. The original code of practice on safety and health in forestry work was published in 1998. This revised code reflects the changes in the sector and the world of work, as well as changes in the roles of competent authorities, employers, contractors, workers and their organizations.

4. The revised code is structured in two parts. Part I covers general provisions related to forestry. Chapter 1 provides an overview of the code’s objectives, application and scope. Chapter 2 outlines the general duties, rights and responsibilities of the sectoral actors. Chapters 3–11 outline general principles, including OSH management systems and organization, OSH reporting, competence, information and training, safety requirement for equipment, personal protective equipment (PPE), welfare, health hazards, and labour protection. Part II outlines technical guidelines for safety and health at the forestry worksite, divided into chapters on silviculture, harvesting, and fire management. Finally, a glossary of technical terms is provided at the end.
Part I. General provisions related to forestry
1. General provisions

1.1. Objective

1. The objective of this code is to provide practical guidance for the use by all those, both in the public and private sectors, who have obligations, responsibilities, duties and rights regarding safety and health in forestry.

2. This code should contribute to improved safety and health in the forest sector in the context of sustainable development by:
   (a) promoting a preventative safety and health culture;
   (b) protecting all workers in the sector from occupational hazards and risks;
   (c) preventing or reducing occupational accidents and injuries, diseases, death, ill health and dangerous occurrences;
   (d) formulating and implementing a coherent national policy and principles on OSH and the welfare of workers and their organizations for the improvement of OSH in forestry and for the protection of the working environment;
   (e) promoting effective consultation and cooperation in line with international labour standards on OSH between governments, employers, workers and their organizations and representatives, as well as business operations, for the improvement of OSH in forestry;
   (f) ensuring compensation according to national law and practices to an injured worker and a worker suffering from occupational diseases to make up for the loss of earnings resulting from an occupational injury or disease, as well as the costs of the medical and related care necessary to maintain, improve and restore the health of the injured worker;
   (g) providing guidance, in line with ILO instruments, on the respective role, obligations, responsibilities, duties and rights of all actors engaged in forestry activities with regard to occupational hazards and risks;
   (h) improving the management of OSH risks at each workplace through the implementation and integration of consistent OSH management systems; and
   (i) improving OSH knowledge and competence in forestry.
   (j) protecting the environment and persons at or near the worksite from hazards arising from forestry activities within the control of the employers and use of hazardous processes, equipment and substances.

1.2. Application and scope

3. This code is applicable to all forestry operations, irrespective of their nature, including the establishment and regeneration of forests, silvicultural work and forest protection, restoration, timber harvesting and transportation. Secondary manufacturing industries (pulp and paper, sawn wood and wood panel production) following from (primary) forestry production, are outside of the scope of this code and are not therefore specifically discussed.

4. This code provides guidance, in accordance with the provisions of national laws and regulations, to:
(a) all government authorities, employers, workers and their respective organizations whose activities influence the safety, health and welfare of workers in forestry;

(b) all individuals involved in forestry operations, including employers, persons in control of premises, workers, contractors and subcontractors, as appropriate to their duties and responsibilities for OSH; and

(c) organizations whose activities influence the safety, health and welfare of persons engaged in forestry work.

5. The provisions of this code should be considered as the minimum requirements for protecting workers’ safety and health as well as other persons, where relevant, in the immediate vicinity of forestry activities.

6. Where relevant, the provisions of this code should be applied to self-employed persons as may be specified by national laws and regulations.

7. Employers, in consultation with workers and their representatives and in accordance with national laws and regulations, should ensure that risks are assessed with a gender perspective and that OSH policies and programmes based on sex- and age-disaggregated data include gender-responsive measures. Employers should also ensure that all workers, without discrimination, have equal opportunities and treatment regarding OSH measures and equal access to OSH services, including participation in OSH decision-making at all levels.

8. This code addresses most of the currently identified hazards and risks associated with forestry. However, changes in the industry or in specific operations may alter the risk profile. This code cannot therefore be assumed to address every hazard or risk. While the code contains detailed provisions, its use should not inhibit the development of new technologies, better practice or the adoption of alternative measures that provide equal to or greater protection to all workers involved in forestry.

9. The adoption of technological or other innovations, and/or new work practices involving such innovations, may have an impact on safety and health in forestry. These should be accounted for in risk management and change management processes, and also in the design and implementation of OSH policies and programmes. This should be based on evidence and data related to the innovations in accordance with relevant national laws and regulations, as well as all OSH standards, and through consultations on OSH aspects between employers and workers and their representatives. Sufficient information and appropriate training should be provided and monitoring mechanisms established.

10. Some measures implemented to protect workers’ safety and health in forestry are intrinsically linked to measures to protect the environment. This relationship should be taken into account by both the competent authorities and employers in designing and implementing their respective environmental sustainability and OSH policies and programmes.

11. This code is not a legally binding instrument, and its provisions are not intended to replace applicable national laws, regulations or other nationally or internationally recognized instruments. In the absence of national laws and regulations on a particular OSH issue, or where these are not up to date, guidance should be drawn from this code, as well as from relevant nationally and internationally recognized instruments. The provisions of this code should be read in the context of national conditions and technical possibilities, and the scale of operations involved.
12. This code contains references to those institutions responsible for the delivery and award of vocational qualifications. Such institutions are urged to review existing curricula in the light of the code’s recommendations for training and the allocation of worksite responsibilities.

13. In the establishment, implementation and review of policies and programmes on OSH under this code, competent authorities and employers’ and workers’ organizations, as well as other stakeholders, should take into account ratified international labour standards and that the fundamental principles and rights at work apply to all workers and employers. They should also take account of the provisions of other relevant ILO instruments, including Conventions, Protocols, Recommendations, codes of practice and guidelines. A list of these is contained in the bibliography at the end of this code.

14. In line with the ILO Declaration on Fundamental Principles and Rights at Work, all ILO Members have an obligation arising from the very fact of membership in the Organization to respect, promote and realize, in good faith and in accordance with the Constitution, the principles concerning the fundamental principles and rights at work, which are the subject of those Conventions.

15. The code acknowledges the mutually reinforcing nature of the fundamental principles and rights at work, recognizing in particular the linkages and inter-complementarities between occupational safety and health and the other fundamental principles and rights at work, namely the principles of freedom of association and the effective recognition of the right to collective bargaining, the elimination of all forms of forced or compulsory labour, the effective abolition of child labour, and the elimination of discrimination in respect of employment and occupation.

2. General duties, rights and responsibilities

2.1. Cooperation, coordination and effective social dialogue

16. This code recognizes that effective OSH systems require social dialogue, joint commitment and consultation between the competent authority, employers, workers and their representatives. The parties should cooperate in a constructive manner to ensure that the objectives of this code are achieved. This Code recognizes that the full implementation of the principles of freedom of association and the effective recognition of the right to collective bargaining are enabling conditions for the attainment of the strategic objective of social dialogue and tripartism.

17. Measures for cooperation should be taken relating to the identification of hazards and risks and the elimination or, where this is not possible, reduction or control of risks to safety and health in forestry. These measures should include the following:

(a) the competent authority should endeavour to promote close cooperation between employers, buyers, manufacturers, suppliers, workers and their representatives on safety and health in forestry;

(b) employers, in discharging their responsibilities, should cooperate as closely as possible with workers and their representatives;

(c) workers should cooperate with their fellow workers and their employers in the discharge by the employers of their responsibilities, and should comply with all prescribed procedures and practices relating to OSH in forestry and receive the necessary information, instruction and training to do so;
(d) in line with national law, workers and their representatives should be given all appropriate information and training on measures taken by the employer to secure OSH;

(e) manufacturers, suppliers, service providers and importers should provide employers with all necessary and available information required for the evaluation of safety and health risks that are likely to be present during a relevant work activity; and

(f) Workers have the responsibility, in accordance with their training and the instructions and means given by their employers, to comply with prescribed OSH measures on the elimination or control of hazards or risks to themselves and others, including through the proper care and use of the personal protective equipment (PPE), facilities and equipment placed at their disposal for this purpose.

18. Whenever two or more employers undertake activities at one forestry operation, they should cooperate with one another and with other persons participating in the forestry work being undertaken in the application of the prescribed safety and health measures.

19. Whenever two or more employers undertake activities simultaneously or successively at one forestry operation, the principal contractor, or other person or body with actual control over or with primary responsibility for overall operation activities, should be responsible for planning, coordinating and monitoring safety and health measures in compliance with national laws and regulations.

20. To the extent that it complies with national laws and regulations, when the principal contractor, or other entity responsible for overall operation activities, is not present at the site, they should nominate a competent person or body on site with the authority and means necessary to ensure effective coordination and compliance with safety and health measures on their behalf.

21. Employers should remain responsible for the application of the safety and health measures in respect of the workers placed under their authority.

22. Governments, employers’ and workers’ organizations and all enterprises, including multinational enterprises, in forestry should observe the principles of the Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration). Multinational enterprises should maintain the highest standards of safety and health, in conformity with national requirements, bearing in mind their relevant experience within the enterprise as a whole, including any knowledge of special hazards.

2.2. Competent authorities

23. The competent authorities, in the light of national conditions and practice and the provisions of this code, and based on an assessment of the safety and health hazards and risks involved and in consultation with the most representative organizations of employers and workers concerned, should:

(a) develop, maintain and control the application of national laws and regulations to ensure the safety and health of workers in forestry and to protect persons at, or in the vicinity of, a forestry site from all risks which may arise from such site; and

(b) formulate, implement and periodically review a coherent national policy on OSH, including the promotion of a systematic approach through OSH management systems in accordance with national laws and regulations.

24. The national laws and regulations adopted in pursuance of paragraph 23 should provide practical application through technical standards, codes of practice, exposure limits, standards of
competency and training for all workers or by other appropriate methods consistent with national conditions and practices; and should establish a structured procedure for consulting with and disseminating information to employers, workers and their representatives.

25. The measures to be taken to ensure that there is organized cooperation between employers and workers to promote safety and health at forestry operations should be prescribed by national laws or regulations or by the competent authority. Such measures should include:

(a) the establishment of joint safety and health committees, with workers' representation at least equal to that of employers' representatives and with such powers and duties as may be prescribed;

(b) the election or appointment of worker safety and health representatives with such powers and duties as may be prescribed and supported with appropriate training and resources;

(c) the appointment by the employer of suitably qualified and experienced persons with appropriate training to promote safety and health; and

(d) the training of workers' safety and health representatives and joint safety and health committee members.

26. The competent authority should establish in accordance with the provisions of relevant ILO international labour standards and considering the need to harmonize such systems internationally:

(a) systems and criteria for identifying safety hazards and appropriate risk control measures relating to structures, facilities, machinery, equipment, transportation, access and egress processes and operations used in forestry;

(b) systems, including criteria, for classifying substances that may be hazardous to health;

(c) systems and criteria for assessing the relevance of the information required to determine whether a substance is hazardous;

(d) requirements for marking and labelling substances; and

(e) criteria for the information contained in the substance safety data sheets received by employers.

27. The competent authority should set out the necessary rules to determine these criteria and monitor compliance with requirements, but is not necessarily expected to undertake technical tasks or laboratory tests itself.

28. If justified on safety and health grounds, the competent authority should:

(a) prohibit or restrict the use of certain hazardous practices, processes or substances; or

(b) require advance notification and authorization before any such restricted practices, processes and substances are used; or

(c) without discrimination, specify categories of workers who, for reasons of safety and health, are not allowed to use specified processes or substances, or are allowed to use them but only under conditions prescribed in accordance with national laws or regulations, taking into account international labour standards.

(d) Ensure accessible information on such restricted practices, processes and substances are made available to the public.

29. The competent authority should ensure the enforcement of national laws and regulations on OSH through an adequate and appropriate system of inspection. The system of enforcement should
provide for corrective measures and adequate penalties for violations of national laws and regulations on OSH.

30. The competent authority should ensure that guidance is provided to employers, workers and their representatives to help them comply with their legal obligations and to confirm the legal rights of all parties. The competent authority should provide assistance and publicly available guidance documents to employers, workers and their representatives with respect to their OSH responsibilities, duties and rights.

31. The competent authority should establish, apply and periodically review in consultation with the social partners a system for the sex- and age-disaggregated recording and notification by employers of occupational accidents, occupational diseases and dangerous occurrences in forestry.

32. The competent authority should make provisions for workers in forestry to have access to work injury insurances and benefits schemes with a view to ensuring timely compensation in case of occupational accidents, disease and ill health, as required.

33. The competent authority should seek to cooperate with competent authorities of other countries to improve safety and health in the industries and their supply chains.

Labour inspectorates

34. Taking into consideration the provisions of the Labour Inspection Convention, 1947 (No. 81), the Protocol of 1995 to the Labour Inspection Convention, 1947, and the Labour Inspection Recommendation, 1947 (No. 81), and of the Labour Inspection (Agriculture) Convention, 1969 (No. 129), as well as of the ILO Guidelines for labour inspection in forestry (2006), and ILO Guidelines on general principles of labour inspection (2022), inspectorates designated by the competent authority should, in a manner prescribed by national laws and regulations:

(a) enforce all relevant laws and regulations in forestry operations;

(b) be informed in a timely manner and before the operations commence, of the location of forestry operations and be given access to all workplaces;

(c) periodically carry out unannounced inspections in the presence of the employer and worker representatives, where appropriate, and monitor compliance and corrective measures taken with all relevant laws and regulations;

(d) provide technical information and advice to assist employers, workers and their representatives with respect to their OSH responsibilities, duties and rights;

(e) keep abreast of the OSH requirements and performance of comparable national or international forestry operations to provide feedback for further development and improvement of safety measures;

(f) monitor compliance with national social security legislation and the nature of employment relationships, types of contracts when this falls under the mandate of the labour inspectorate, and workers’ compensation schemes; and

(g) participate, in cooperation with the recognized organizations of employers and workers, in formulating and updating safety rules and measures to be adopted at the national and enterprise levels.

35. Labour inspectors should, in a manner prescribed by national laws and regulations:
(a) be competent to deal with the OSH issues for all workers associated with forestry and be able to provide support and advice;

(b) have the authority to investigate accidents, dangerous occurrences and diseases and complaints;

(c) notify the employer, the workers concerned and their representatives, as well as joint safety and health committees, of the findings of inspections, and monitor the implementation of remedial action;

(d) have the authority to remove workers from situations involving an imminent and/or serious danger to life or health;

(e) periodically determine whether an existing OSH management system or OSH elements are in place, adequate and effective;

(f) have authority to suspend or restrict forestry activities on safety and health grounds, until the condition giving rise to the suspension or restriction has been corrected;

(g) cooperate with other government authorities to take appropriate action; and

(h) have access to all worker health and safety education and training records and appropriate preventive, protective and mitigative measures.

36. The authority, rights, procedures and responsibilities of labour inspectors should be communicated to all affected parties.

2.3. Employers

37. Employers should be required to ensure that, so far as is reasonably practicable, the workplaces, machinery, equipment and processes under their control are safe and without risk to health of workers and persons in the immediate vicinity and working environment. This is achieved through the provision of adequate means and suitable organization and establishment of a suitable programme on safety and health consistent with national laws and regulations, and should comply with the prescribed safety and health measures at the workplace regarding hazards or risks to safety and health in forestry, including technical standards, codes of practice and guidelines as prescribed, approved or recognized by the competent authority.

38. Employers should ensure that workers receive adequate information, instruction and training on safety and health regulations, policies, procedures and requirements, and that such information is provided to them in forms and languages that they easily understand.

39. Employers should, in consultation with workers and their representatives in line with national law, conduct a risk assessment of all work activities carried out on the forestry operation so as to provide and maintain workplaces, plant, equipment, tools and machinery, and so organize forestry work to eliminate, or if not possible, minimize or control as far as is reasonably practicable risk of accident or injury to the health of workers as well as other persons in the immediate vicinity of forestry activities. In particular, forestry work should be so planned, prepared and undertaken to ensure that:

(a) risks liable to arise at the workplace are eliminated, controlled and minimized as far as possible;

(b) excessively or unnecessarily strenuous work positions and movements are eliminated or when not possible minimized;
(c) organization of work, particularly with respect to hours of work and rest breaks, takes into account the safety and health of workers;

(d) materials and equipment used are suitable and comply with safety and health standards and requirements;

(e) working methods are employed which protect workers against the harmful effects of chemical, physical, biological and psychosocial risks;

(f) full compliance with safety regulations is achieved; and

(g) all personnel (managers, supervisors and workers) are competent to conduct their allocated tasks (or fulfil their duties).

40. In taking preventive and protective measures, the employer should address the hazard and associated risk in accordance with the hierarchy set out in paragraph 86. If the employers, workers or their representatives cannot agree, the issue should be referred to the competent authorities in accordance with paragraph 30.

41. In line with national law, employers should initiate and maintain a process of consultation and cooperation with workers and their representatives concerning all aspects of safety and health in forestry, in particular as regards the measures of prevention and protection specified in this code. This process should be carried out within the framework of joint safety and health committees, in accordance with the Occupational Safety and Health Convention, 1981 (No. 155), the Occupational Safety and Health Recommendation, 1981 (No. 164), or through another mechanism determined by the competent authority or by collective and mutual agreements, as appropriate.

42. Employers should arrange for regular safety inspections to be carried out by competent persons at suitable intervals of all buildings, plant, equipment, tools, machinery, workplaces and systems of work under the control of the employer at the forestry operation in accordance with national laws, regulations, technical standards or codes of practice. As appropriate, the competent person should examine, test and record by type or individually to ascertain the safety of machinery and equipment.

43. When acquiring plant, equipment or machinery, employers should ensure that it takes account of ergonomic principles in its design and conforms to relevant national laws, regulations, standards or codes of practice and, if there are none, that it is so designed or protected that it can be operated safely and without risk to health.

44. Employers should provide adequate and competent supervision of work. Such supervision should ensure that workers perform their work with due regard to their safety and health.

45. Employers should assign workers only to employment for which they are competent to undertake.

46. Employers should ensure that all managers, supervisors, workers, and worker safety and health representatives are suitably instructed in the hazards and risks connected with their work and environment and trained in the measures necessary to avoid accidents and injury to health.

47. Employers should make the necessary arrangements to investigate occupational accidents, illnesses and incidents, in cooperation with joint safety and health committees and/or workers and their representatives, to identify all causes, and should take the measures necessary to prevent recurrences of similar occupational accidents, illnesses and incidents. The employer should also report, as specified by national laws and regulations, to the competent authority on occupational accidents, occupational diseases and dangerous occurrences.

48. Employers should register workers with the institution responsible for workers’ compensation, employment or work injury benefits or social security, as appropriate in the national context, to
ensure that workers are effectively covered against occupational accidents and occupational diseases. They should pay the required contributions or premiums, and report any occupational accident or occupational disease to the responsible institution.

49. Employers should take all practicable steps to ensure that workers are made aware of and comply with the relevant national or local laws, regulations, technical standards, codes of practice, instructions and advice relating to prevention of accidents and injuries to health.

50. Employers should ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been remedied.

51. Where there is an imminent danger to the safety or health of workers, the employer should take immediate steps to stop the operation and evacuate workers, as appropriate, and cannot require workers to return to a work situation in which there is a continuing imminent and serious danger to life or health.

52. On dispersed sites and where small groups of workers operate in isolation, employers should establish communication and, where appropriate, transport systems, along with a checking system, by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work.

53. Employers should provide appropriate first aid and medical facilities, training and welfare facilities to workers. Employers should also ensure access for workers to occupational health services and health surveillance. Provisions should be adopted to protect the privacy of the workers and to ensure that health surveillance is not used for discriminatory purposes or in any other manner prejudicial to their interests.

54. Workers quarantined because of ill health or required to self-isolate should receive normal compensation and benefits and be protected from dismissal as far as practicable.

55. Where risks cannot be adequately controlled by other means, employers should provide suitable PPE, at no cost for the worker, and ensure its proper use.

56. Employers should ensure that systems are in place so that when managers, supervisors, safety and health officers and workers observe non-compliance with safety and health regulations, technical standards and applicable codes of practice by any person, they should take appropriate corrective action immediately.

2.4. Workers

57. Governments have the duty to adopt, implement and effectively enforce national laws and regulations and to ensure that fundamental principles and rights at work and ratified international labour standards protect and are applied to all workers in forestry, taking into account their obligations under other international labour standards.

58. Workers should comply and cooperate in ensuring safe and healthy working conditions to the extent of their control over the equipment and methods of work and may express views on working procedures adopted as they affect safety and health, without fear of retaliation.

59. Workers have the right to obtain proper information and training from the employer regarding safety and health hazards and associated risk control measures related to the work processes. Workers also have the right to obtain proper information and training from the competent authority on, as well as on their right to, compensation and medical care in case of occurrence of occupational accidents and diseases, and to the recourse and remedies available to them in case
of non-respect of such rights. This information and training should be presented in forms and languages which the workers easily understand.

60. Workers have the right to remove themselves and inform their co-workers in the vicinity from danger when they have reasonable justification to believe that there is an imminent and/or serious risk to their safety or health. They should have the duty and a clear means to inform their supervisor and safety and health representative immediately. Workers should not be penalized for taking any action as described in this paragraph.

61. In accordance with national legislation, workers should:

(a) cooperate with their employer in the application of the prescribed risk control measures;
(b) take reasonable care for their own safety and health and that of other persons who may be affected by their acts or omissions at work;
(c) use and take care of PPE and facilities placed at their disposal and not misuse anything provided for their own protection or the protection of others;
(d) report forthwith to their immediate supervisor, and to the workers’ safety representative where one exists, any situation which they believe could present a risk and which they cannot properly deal with themselves, as well as reporting accidents, occupational illnesses, dangerous occurrences, and near-miss events;
(e) comply with the prescribed risk control measures; and
(f) participate in regular safety and health meetings and training programmes during normal working hours.

62. Workers, unless duly authorized, suitably trained and qualified, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury.

63. Workers should not, or be required to, operate or interfere with plant and equipment that they have not been duly authorized, suitably trained, and qualified to operate, maintain or use.

64. Workers should have designated areas to rest or sleep away from dangerous places such as railway tracks, garages, under vehicles, or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment.

2.5. Principal contractors, contractors and subcontractors

65. The provisions pertaining to the responsibilities and duties of an employer in Chapter 2.3 should apply to contractors accordingly.

66. Contractors and subcontractors should ensure that any person under their control performing tasks that may affect OSH is competent in terms of training and experience, and should keep the associated records.

67. Contractors and subcontractors should comply with the arrangements as defined in the OSH management system of the owner, principal contractor, or other person or body with actual control over or primary responsibility for overall site activities, which should, for example:

(a) include the contractor and subcontractor performing a risk assessment and establish risk controls for their work. The contractor and subcontractor should comply with the risk controls and inform the principal contractor or the body with primary responsibility of any changes;
(b) include OSH criteria in procedures for evaluating and selecting contractors and subcontractors;

(c) establish effective ongoing communication and coordination between appropriate sections of the forestry operation, between the principal contractor or the body with primary responsibility, the contractor and subcontractor prior to commencing work, which should include provisions for identifying hazards and the measures to eliminate and control risks;

(d) include arrangements for reporting work-related injuries and diseases, ill health and dangerous occurrences among the contractor’s and subcontractor’s workers while performing work for the forestry operation;

(e) provide relevant workplace safety and health hazard awareness, information, instruction and training to contractors and subcontractors or their workers prior to commencing work and as work progresses, as necessary;

(f) include regular monitoring of their OSH performance;

(g) include periodic joint safety and health inspections by the principal contractor or the body with primary responsibility, contractors and subcontractors involved in the work at the site to identify and control harm and hazards at work; and

(h) ensure that on-site OSH policies, procedures and arrangements are followed by the contractor(s) and subcontractor(s).

68. When using contractors and subcontractors, the principal contractor or the body with primary responsibility should ensure that:

(a) contractors and subcontractors develop a safety and health plan in accordance with the OSH management system in place in the forestry operation that is approved by the employer prior to commencing work;

(b) the same safety and health rights outlined above apply to contractors and subcontractors and their workers as to the workers in the establishment, including training requirements and procedures to investigate accidents, occupational illnesses and dangerous occurrences;

(c) where required, only such contractors and subcontractors are used that have been duly registered or hold licences; and

(d) contracts specify safety and health requirements as well as sanctions and penalties in case of non-compliance. Contracts should include the right for supervisors mandated by the principal contractor or the body with primary responsibility to inspect work and to stop work whenever a risk of serious injury is apparent and to suspend operations until the necessary remedies have been put in place.

2.6. Suppliers, importers and manufacturers

69. In accordance with the guidance contained in the ILO code of practice on safety and health in the use of machinery, national laws and regulations and other measures should be implemented to ensure that those who design, manufacture, import, provide or transfer machinery, equipment or substances for use in forestry:

(a) ensure that the machinery, equipment or substances do not entail dangers for the safety and health of those using them correctly and are in compliance with national safety laws and regulations or internationally recognized instruments applicable to their design and construction;
(b) make available:

(i) information concerning their requirements for the correct set-up, use and maintenance of machinery and equipment and the correct use of substances;

(ii) information concerning the hazards and risks of machinery and equipment, including the dangerous part of machinery and hazardous components of equipment, and the dangerous properties of hazardous substances and physical agents or products; and

(iii) information on how to eliminate or control risks arising from the identified hazards associated with the products.

70. In accordance with the ILO’s Chemicals Convention, 1990 (No. 170), suppliers of chemicals, whether manufacturers, importers or distributors, should provide users with the relevant safety data sheets and with instructions for the safe use of chemicals.

3. Occupational safety and health management systems

3.1. Introduction

71. Improving working conditions in forestry operations should be approached in an inclusive and systematic way. In order to achieve acceptable and environmentally sound OSH conditions, it is necessary to continually invest in permanent structures for their continuous review, planning, implementation, evaluation and action. This should be done through the implementation of OSH management systems and in line with the forestry operation life cycle. These systems should be specific to the forestry operation and correspond to its size and the nature of its activities. The design and application of these systems should be guided by the Guidelines on occupational safety and health management systems: ILO–OSH 2001 and also by the 10 Keys for gender sensitive OSH practice – Guidelines for gender mainstreaming in occupational safety and health (ILO, 2013).

72. The OSH management system should contain the main elements of policy, organizing, planning and implementation, evaluation and action for improvement as shown in figure 1 below.

73. OSH measures and measures to protect the environment are intrinsically linked. It is strongly recommended that forestry operations, alongside an OSH management system, should have an environmental management system in place that identifies the environmental impact and facilitates the establishment of environmental performance targets and monitors progress through indicators.
3.2. Occupational safety and health policy

74. The employer, in consultation with workers and their representatives, should set out in writing an OSH policy, which should be:

(a) specific to the forestry operation and appropriate to its size and the nature of its activities;
(b) concise, clearly written, dated and made effective by the signature or endorsement of the employer or the most senior accountable person in the operation;
(c) communicated and readily accessible to all persons at their place of work;
(d) reviewed for continuing suitability; and
(e) made available to relevant external interested parties, as appropriate.

75. The OSH policy should include, at a minimum, the following key principles and objectives to which the forestry operation is committed:

(a) protecting the safety and health of all workers in the operation by preventing occupational injuries, occupational diseases, ill health and incidents;
(b) complying with relevant OSH national laws and regulations, voluntary programmes, collective agreements on OSH and other requirements to which the forestry operation subscribes;
(c) ensuring that workers and their representatives are consulted and encouraged to participate actively in all measures of the OSH management system; and
(d) continually improving the performance of the OSH management system.

76. The OSH management system should be compatible with or integrated in other management systems on the forestry operation.

Worker participation

77. Worker participation is an essential element of the OSH management system in forestry operations.

78. The employer should ensure that workers and their representatives are continuously consulted, informed and trained on all aspects of OSH, including emergency arrangements, associated with their work.

79. The employer should make arrangements for workers and their representatives to have the time and resources to participate actively in the processes of organizing, planning and implementation, evaluation and action for improvement of the OSH management system.

80. The employer should ensure, as appropriate, the establishment and efficient functioning of a joint safety and health committee and the recognition of workers’ representatives, in accordance with national laws and practice.

3.3. Responsibility and accountability

81. The employer should have overall responsibility for the protection of workers’ safety and health and provide leadership for OSH activities in the forestry operation.

82. The employer should allocate resources, responsibility, accountability and authority for the development, implementation and performance of the OSH management system and the achievement of the relevant OSH objectives. Structures and processes should be established which:

(a) ensure that OSH is a line-management responsibility that is known and accepted at all levels;

(b) define and communicate the responsibility, accountability and authority of persons who identify, evaluate or control OSH hazards and risks in the forestry operation;

(c) provide effective supervision, as necessary, to ensure the protection of workers’ safety and health;

(d) promote cooperation and communication among all stakeholders in the forestry operation, including workers and their representatives, and, as relevant, in coordination with other employers, as well as contractors, suppliers and manufacturers and sustainable forest management certifying agencies to implement the measures of the OSH management system;

(e) fulfil the principles of OSH management systems contained in relevant ILO instruments, national guidelines, tailored guidelines or voluntary programmes, as appropriate, to which the forestry operation subscribes;

(f) establish and implement a clear OSH policy and measurable objectives;

(g) establish effective arrangements to identify and eliminate or control work-related hazards and risks, and promote health at work;

(h) establish prevention and health promotion programmes;
(i) ensure effective arrangements for the full participation of workers and their representatives in the fulfilment of the OSH policy;

(j) provide appropriate resources to ensure that persons responsible for OSH, including the joint safety and health committee, can perform their functions properly; and

(k) ensure effective arrangements for the full participation of workers and their representatives in joint safety and health committees, where they exist.

83. A person or persons at the senior management level should be appointed, where appropriate, with responsibility, accountability and authority for:

(a) the development, implementation, periodic review and evaluation of the OSH management system;

(b) periodic reporting to the senior management on the performance of the OSH management system; and

(c) promoting the participation of all members in the forestry operation.

3.4. Initial review and system planning

84. Prior to commencing work, the employer should ensure that an initial review of the existing OSH management system is carried out by competent persons, in consultation with workers and their representatives, as appropriate; or in the case of a newly established forestry operation, the initial review should serve as a basis for establishing an OSH management system. It should:

(a) identify the current applicable ILO instruments, national laws and regulations, national guidelines, specific guidelines, voluntary programmes and other relevant requirements for the activities to be carried out;

(b) identify, anticipate and assess hazards and risks to safety and health arising from the existing or proposed work environment and work organization;

(c) determine whether planned or existing controls are adequate to eliminate hazards or control risks; and

(d) analyse other available data, including data disaggregated by sex and age, and in particular data provided from workers’ health surveillance (see Appendix I), the surveillance of the working environment (see Appendix II) and active and reactive monitoring, if available.

85. The initial review should be used in the systematic development of safety and health arrangements in forestry and as the basis for the planning and practical implementation of the OSH policy.

3.5. Hazard identification, risk assessment, and preventive and protective measures

86. Employers should have a system in place, in consultation with all workers and their representatives, to identify hazards, assess risks to safety and health and apply risk control measures, on an ongoing basis and in conformity with national laws and regulations. These measures should be implemented in the following order of priority:

(a) eliminate the hazard/risk;

(b) control the risk at source, through measures such as substitution (for example, replacing hazardous equipment or substances with less hazardous ones) or engineering controls;
(c) minimize the risk through the design of safe work systems; and
(d) in so far as the risk remains, the employer should provide for the use of adequate PPE, including protective clothing, ergonomically designed and which takes into account the characteristics of the wearer and ensures a good fit and at no cost to workers, and implement measures and training to ensure its appropriate use and maintenance.

87. In giving effect to the above, the employer should establish, implement and maintain documented procedures to ensure that the following activities take place:

(a) hazard identification;
(b) risk assessment;
(c) elimination, or if not possible, minimization of risks through adequate planning, adoption and implementation of prevention and protective measures; and
(d) a process to monitor and evaluate the effectiveness of these activities.

88. The identification of hazards in the workplace should take into account:

(a) the situation or events or combination of circumstances and/or exposures that have the potential to give rise to occupational accident, disease, ill health or dangerous occurrences;
(b) the nature of potential occupational injury, illness or ill health relevant to the activity, product or service;
(c) past occupational injuries, incidents, dangerous occurrences and illness or ill health;
(d) the way work is organized, managed, carried out and any related changes;
(e) the design of workplaces, work processes, materials, plant and equipment;
(f) the fabrication, installation, commissioning, handling and disposal of materials, workplaces, plant and equipment;
(g) the purchasing of goods and services;
(h) the contracting of plant, equipment, services and labour, including contract specification and responsibilities in relation to and of contractors and their subcontractors; and
(i) the inspection, maintenance, testing, repair and replacement of plant and equipment.

89. The employer should perform a risk assessment to determine the level of risk of injury or illness associated with each identified hazard, for the purpose of control. All risks should be assessed in consultation with workers and their representatives and should have control measures assigned, based on the assessed level of risk, considering the likelihood and severity of injury or illness from the identified hazard. The priority for control increases as the assessed level of risk rises. For practical examples and guidance, see the ILO's Guidelines for labour inspection in forestry (2006); A 5 Step Guide for employers, workers and their representatives on conducting workplace risk assessments (ILO, 2014); and the Training package on workplace risk assessment and management for small and medium-sized enterprises (ILO, 2013).

90. Risk control measures should be monitored and reviewed at regular intervals in consultation with workers and their representatives and, if necessary, revised, especially when circumstances change or if new information becomes available about the risks identified or the suitability of existing control measures. Risk control measures should also be reviewed and, if necessary, revised following any occupational accidents and diseases, ill health, dangerous occurrences and incidents.
91. Consideration should be given to introducing specific safety and health measures, controls or adaptations necessary to protect workers in vulnerable situations, including but not limited to workers who are pregnant or breastfeeding, migrant workers, young or inexperienced workers, apprentices, persons with disabilities or older workers.

### 3.6. Contingency and emergency preparedness

#### 3.6.1. Emergency preparedness

92. Emergency planning, prevention, preparedness and response arrangements should be established, periodically reviewed and maintained throughout the forestry operation life cycle by the employer in cooperation with workers, external emergency services and other bodies, where applicable. These arrangements should identify the potential for accidents and emergency situations and address the prevention of OSH risks associated with them. Arrangements should be made according to the location and environment of the forestry operation and should take into account the size and nature of the activities associated with each operation.

93. In consultation with the relevant competent authorities, emergency plans should take account of the risks arising from extreme weather events, including floods, extreme heat or cold, wildfires and natural disasters, where appropriate.

94. In consultation with the relevant competent authorities, emergency plans should take account of other public health risks that could impact the workforce, including communicable and vector-borne diseases, particularly endemic, epidemic and pandemic infections, where appropriate.

95. Emergency plans should be made and updated for every forestry operation in accordance with relevant internationally recognized instruments and national laws and regulations, taking into account the size and nature of the activities in the operation at each location. They should:

   a. ensure that the necessary information, internal communication and coordination are provided to protect all workers in the event of an emergency in the operation, including details of the location and contact details of health and emergency services and facilities;
   
   b. provide information to, and communication with, the relevant competent authorities, and the neighbourhood and emergency response services;
   
   c. address first aid and medical assistance, fire response and evacuation of all people at the operation; and
   
   d. provide relevant information, instruction and training to all workers at the operation and any person who may be involved in an emergency, at all levels and according to their competence, including regular exercises in emergency prevention, preparedness and response procedures.

96. The emergency response plan should be developed for each forestry operation and should be sufficiently comprehensive to deal with all types of emergencies. The emergency response plan should be evaluated periodically in consultation with workers and their representatives, and the necessary improvements should be recorded and implemented.

97. The emergency response plan should include, for each foreseeable scenario, at a minimum:

   a. emergency escape routes and procedures, including signings and markings indicating the escape routes to be used;
   
   b. procedures to be followed by workers who remain to perform critical operations before evacuation;
(c) the evacuation of the forestry operation site and the surrounding area to a place of safety;
(d) procedures to account for all workers after the emergency evacuation is complete;
(e) rescue and medical duties for workers who are assigned to perform them;
(f) the means for reporting and raising the alarm in the event of fire and other emergencies;
(g) the provision of relevant information, instruction and training to all persons engaged in work at the operation, at all levels, including regular exercises in emergency prevention, preparedness and response procedures;
(h) the provision of protected means of escape for high-risk sites to allow a safe evacuation; and
(i) all necessary emergency equipment identified in the emergency plan should be in place and in good repair, within its expiry date with staff aware of its location and, where appropriate, trained in its safe use.

98. A chain of command should be established to ensure that workers have no doubt about who has the authority to make decisions. Emergency response teams should be established and with designated coordinators responsible for:

(a) assessing the situation and determining whether an emergency exists that requires activation of the emergency procedures;
(b) acting to minimize the event, for example controlling a fire, controlling leaks and spills, directing an emergency shutdown or suspending action specifically prohibited if persons are at risk;
(c) directing all efforts in the area, including evacuating personnel and minimizing the loss of property;
(d) ensuring that emergency response services, such as medical aid and fire response, are summoned when necessary;
(e) providing information to, and communication with, the relevant competent authorities and the neighbourhood and emergency response services; and
(f) directing the shutdown of operations when necessary.

99. Emergency alarms should be distinguishable from other alarms and capable of being seen and/or heard by everyone, including persons with disabilities and those working at remote locations.

100. All workers in the forestry operation should be informed of the procedures to be followed in case of emergency through the provision of up-to-date information, including information on the location of meeting points for evacuation, which are areas of safety where workers should assemble in the event of an emergency.

101. Workers working alone in remote or inaccessible places should be provided adequate means of communication to raise the alarm and the means of rapidly summoning assistance in an emergency.

102. Notwithstanding the paragraphs above, emergency procedures, first aid and fire response for the handling, storage and transport of chemicals, disposal and treatment of waste chemicals, the release of chemicals resulting from work activities and containers for chemicals at forestry operations should be established and based on the provisions of Chapter 14 of the ILO code of practice on safety in the use of chemicals at work (1993).

103. Evacuated workers should be compensated, as practicable, for time it is necessary to be away from work as a result of an emergency response.
3.6.2. **First aid**

104. The employer should be responsible for ensuring that first aid, including the provision of trained personnel, is available. Arrangements should be made for ensuring the removal for medical attention of workers who have suffered an accident or sudden illness.

105. The manner in which first aid facilities and personnel are to be provided should be determined in accordance with national laws and regulations, and drawn up after consulting the competent health authority and the most representative employers’ and workers’ organizations.

106. Given the common practice that forestry workers operate in small groups at separate locations, a sufficient number of workers, at a minimum one per shift, should be trained in basic first aid and their contact details should be readily available. This training should include the treatment of open wounds and performing resuscitation. In areas where the work involves the risk of intoxication by chemicals, fumes or smoke, animal or insect bites or stings, or infections or related hazards, first aid training and treatment limited to acute reactions should be extended accordingly, within the scope of their training, in consultation with a competent person or organization.

107. First aid training should be provided at regular intervals to ensure that knowledge and skills do not become outdated or forgotten.

108. Suitable rescue and resuscitation equipment, as required, should be kept readily available at the worksite. All workers should be informed of the location of this equipment.

109. First aid kits or boxes, as required, containing prescribed items and, as appropriate, suitable medicines within the competence of the person holding the first aid kit, should be provided and be readily accessible at all workplaces, including isolated locations, in transport vehicles and for maintenance teams, and should be protected against contamination. These first aid kits or boxes should be clearly labelled and contain nothing other than first aid supplies.

110. First aid kits and boxes should be stocked in order to address any potential emergency situation that may be encountered by forestry workers; they should include simple and clear instructions, be kept under the charge of a responsible person qualified to render first aid, and be regularly inspected and kept properly stocked.

111. Employers should ensure suitably trained first aiders are available at all times and that medical aid is summoned where necessary. All necessary emergency equipment identified in the emergency plan should be in place and in good repair, with staff aware of its location and, where appropriate, trained in its safe use.

112. Safety data sheets for hazardous products used at the forestry operation should be kept readily available and used in the application of first aid.

113. A first aid register should be kept at the worksite to record individuals who received first aid, their injuries and treatment details. The information in this register is confidential and should only be accessible to authorized personnel. Anonymized information may be made available, excluding confidential information, to the competent authority and the joint safety and health committee for the purposes of incident and injury analysis.

3.6.3. **Rescue**

114. Provision should be made for rapid evacuation in the event of injury or illness which requires medical assistance.
115. An appropriate escape and rescue plan should be prepared in writing in every worksite. Such plans should take into account relevant geographic, geological and other natural features that could impede rescue efforts, and be communicated to employees.

116. Transport or a means of communication should be available at the worksite for contacting rescue services in case of an emergency. The functioning of the communication arrangements should be checked regularly.

117. All workers should be informed of the procedures to be followed in case of an emergency. Information should also be provided on the worksite and on the location of meeting points for evacuation.

118. At permanent worksites a place should be provided where an ill or injured person might rest in comfort until the evacuation is under way.

119. Although initial first aid should be given before moving the patient, simple means should also be accessible for immobilizing an injured or sick person, if necessary, for transporting them from the scene of the accident. Notification of authorities, which may include appropriate documentation, should be sought.

120. Vehicles for transportation to an ambulance meeting point should always be available. If practicable and appropriate, helicopter landing areas should be designated and suitably identified and made known to all personnel present at the worksite.

121. Where medical assistance is not available within a reasonable distance, particularly in remote areas, consideration should be given to establishing an on-site dispensary and healthcare facilities based on a risk assessment.

3.7. Management of change

122. The impact on OSH of internal changes (for example, in staffing, processes, working procedures, organizational structures or acquisitions) and external changes (for example, in national laws and regulations, organizational mergers and developments in OSH knowledge and technology) should be evaluated in consultation with workers and their representatives and appropriate preventive steps taken prior to the introduction of changes.

123. A risk assessment should be carried out before any modification of the project schedule or introduction of new contractors, work methods, materials, technological changes, processes or equipment in order to ensure that all risks are at an acceptable level.

124. Whenever new materials, technological changes, processes or equipment are introduced and new working methods are needed, special attention should be paid to informing and training workers and their supervisors/managers on their implications for safety and health (see Chapter 6 of this code – Competence, information, instruction and training).

Non-routine work

125. While much of the work in forestry should be covered by established controls developed through the risk management process, some non-routine work may fall outside this process. This requires the creation and implementation of processes to identify such work or instances for which established procedures are seen as inadequate and to ensure that a risk assessment is carried out for these activities before they take place.

126. Such non-routine work might include:
   (a) a type of work that has never been performed before by the team or at the site;
(b) work that is only performed infrequently;
(c) work that is outside normal duties; and
(d) work that must be performed in a different way to a documented procedure (including due to an approaching deadline or instances for which a procedure is identified as inadequate).

127. Responses to the identification of non-routine work should include the conducting of a formal risk assessment to ensure that residual risks are at an acceptable level and, if not, to implement additional risk control measures following the hierarchy of controls (see paragraph 86).

128. Arrangements to support this approach to non-routine work should be in place very early on in the development and operation of a forestry operation.

3.8. Contracting

129. Arrangements for contracting should be established and maintained to ensure that the forestry operation's safety and health requirements are applied to contractors and their workers.

130. Arrangements for contractors working on site should:
(a) include OSH criteria in procedures for evaluating and selecting contractors;
(b) establish effective ongoing communication and coordination between appropriate levels of the forestry operation and the contractor prior to commencing work. This should include provisions for communicating hazards and the measures to prevent and control them;
(c) include arrangements for the reporting to the principal contractor or the body with primary responsibility, and observe any statutory reporting requirements of occupational injuries, occupational diseases, ill health and incidents among the contractors' workers while performing work for the forestry operation;
(d) provide relevant workplace safety and health hazard awareness and training to contractors or their workers prior to commencing work and as work progresses, as necessary;
(e) regularly monitor the OSH performance of contractor activities on site;
(f) ensure that on-site OSH procedures and arrangements are followed by the contractor(s); and
(g) periodically evaluate the contractor's performance to ensure compliance with the required standards.

3.9. Performance monitoring and evaluation

131. The processes of hazard identification, risk assessment and control should be subject to periodical monitoring and evaluation of performance and modified, as necessary, to establish an ongoing process for continual improvement in all cases of dangerous occurrences and where there are significant sentinel health events. This should be carried out by the employer, in consultation with the workers and their representatives.

132. Performance monitoring and evaluation of the OSH management system should:
(a) be used as a means of determining the extent to which OSH policy and objectives are being implemented and risks are controlled;
(b) include both active and reactive monitoring and should not be based only on occupational injury and diseases, ill health and dangerous occurrences statistics;
(c) be recorded; and
(d) be used to continuously improve health and safety risk management.

4. Safety and health organization

4.1. Occupational health services

133. A multiplicity of health hazards and their risks are present in forestry work and every effort should be made to raise awareness of this reality and the need to safeguard health.

134. Consistent with the Occupational Health Services Convention (No. 161) and Recommendation (No. 171), 1985, the competent authority should make provision for the establishment of occupational health services:

(a) by enacting laws or regulations;

(b) through collective agreements or as otherwise agreed upon by the employers and workers concerned;

(c) in any other manner approved by the competent authority after consultation with the representative organizations of employers and workers concerned; or

(d) a combination of any of the above.

135. Occupational health services may be organized as a service for a single worksite or as a service common to a number of worksites, as appropriate, and by:

(a) sites or groups of sites concerned;

(b) public authorities or official services;

(c) any institutions authorized by the competent authority; or

(d) a combination of any of the above.

136. Appendix I provides further information and guidance on workers’ health surveillance and Appendix II on surveillance of the working environment.

4.2. Safety and health officers

137. At every forestry operation, notwithstanding the employer's overall duties and responsibilities and in line with national laws and regulations, the employer should appoint one or more safety and health officers to coordinate all matters relating to safety and hygiene on the site.

138. Only competent persons should be appointed as safety and health officers.

139. Safety and health officers in consultation with workers and their representatives should assist in the prevention of occupational accidents and occupational diseases and in particular should:

(a) advise management and other persons responsible for OSH, especially on:

(i) the planning and installation of facilities, including welfare and sanitary facilities;

(ii) the acquisition of working equipment and the introduction of work processes;

(iii) the selection, supply maintenance and safe use of PPE;

(iv) the organization of workshops, methods of work and the working environment; and

(v) other general preventive and protective measures described in this code;
(b) conduct safety inspections:
   (i) of working installations and technical devices, especially before they are put into service, and of processes, especially before they are brought into operation;
   (ii) of systems of work at regular intervals, reporting any deficiencies to the employer or to other persons responsible for OSH and proposing measures for remedying such deficiencies;
   (iii) to investigate the causes of accidents and diseases and compile reports on the causes and circumstances of every lost-time accident, minor accident and dangerous occurrence, as well as the statistics produced, ensuring their comparability with those of other forestry operations;
   (iv) to observe whether adequate PPE is being provided, maintained and used adequately;
   (v) to compile and evaluate the results of investigations and propose to management measures to prevent the occurrence and recurrence of accidents;
   (vi) and cooperate with surveillance and monitoring programmes for epidemiological diseases for the prevention of risk;
   (vii) to exercise surveillance over the execution of specific accident prevention measures; and
   (viii) to report to the employer deficiencies in the compliance with the effective implementation of official regulations and instructions relating to safety, health and welfare facilities;

(c) assist workers to comply and cooperate with OSH requirements, and especially to instruct them in the occupational hazards to which they are exposed and in the use of the equipment and measures for reducing associated risks, and cooperate and participate in the periodic training of first aid workers and provide comprehensive safety induction for newly incoming workers and/or third parties;

(d) if necessary to prevent any risk, report to the official occupational health services or labour inspectorate, without fear of retaliation or undue consequences as prescribed in national laws and regulations, any unsatisfactory conditions as regards safety and health that the employer fails to remedy within a reasonable time; and

(e) work in close collaboration with the members of the joint safety and health committee and worker safety representatives, and inform them of all important occurrences and all proposals made.

4.3. Joint safety and health committees

140. Employers should establish joint safety and health committees where workers have at least equal representation with employers’ representatives consistent with national laws and regulations for the participation of workers in ensuring safe working conditions. Representatives of workers and management should meet regularly, and whenever necessary, to discuss all aspects of safety and health at the forestry operation.

141. The employer should provide the joint safety and health committee with the facilities, training and assistance necessary to perform its functions, including all necessary safety and health information required for committee representatives, and to educate workers on:

(a) their right to refuse unsafe work without fear of reprisals or undue consequences;
(b) their right and duty to participate in all aspects of their safety and health; and
(c) their right to know how their work activities may affect their safety and health.

142. The employer should notify the joint safety and health committee:
(a) as soon as practicable, of any occupational accident, occupational disease or dangerous occurrence at the forestry operation; and
(b) in good time before any inspection or investigation by the competent authority at the forestry operation regarding which the employer has received advance notice.

143. National laws or regulations should specify the powers and functions of joint safety and health committees.

4.4. Worker safety and health representatives

144. Workers have the right to collectively select safety and health representatives.

145. Workers’ health and safety representatives or joint safety and health committees or where these committees don’t exist, other workers and their representatives should:
(a) represent workers in all matters bearing on safety and health at the forestry operation;
(b) participate in inspections and investigations conducted by the employer and by the competent authority at the workplace and to monitor and investigate OSH matters;
(c) have recourse to advisers and independent experts and their representative organizations;
(d) consult with the employer in a timely fashion on OSH matters, including policies and procedures;
(e) consult with the competent authority;
(f) receive, relevant to the area for which they have been selected, notice of occupational accidents and diseases, ill health, and dangerous occurrences;
(g) be given adequate information on safety and health matters, enabled to examine factors affecting safety and health, and encouraged to propose measures on the subject;
(h) be consulted when major new safety and health measures are envisaged, and before they are carried out;
(i) be consulted in planning alterations of work processes, work content, work hours and rest breaks and organization of work, which may have safety or health implications for the workers;
(j) be given protection from dismissal and other measures prejudicial to them while exercising their functions in the field of OSH as workers and their representatives or as members of joint safety and health committees;
(k) be able to contribute to the decision-making process at the level of the undertaking regarding matters of safety and health;
(l) have access to all parts of the workplace and be able to communicate with the workers on safety and health matters during working hours at the workplace;
(m) be able to contribute to negotiations in the undertaking on OSH matters;
(n) have reasonable time during paid working hours to exercise their safety and health functions and to receive training related to these functions;
(o) receive adequate periodic training in OSH at no cost;
(p) promote and encourage the cooperation of workers in the application of safety and health regulations; and
(q) provide information and cooperate in efforts to achieve a continuous improvement in safety and health performance.

5. Reporting, recording and notification of occupational accidents and diseases, ill health and dangerous occurrences

146. In the establishment, review and application of systems for the reporting, recording and notification of occupational accidents, occupational injuries, occupational diseases, ill health and dangerous occurrences, the competent authority should take account of the Employment Injury Benefits Convention, 1964 [Schedule I amended in 1980] (No. 121), the Occupational Safety and Health Convention, 1981 (No. 155), the Protocol of 2002 to the Occupational Safety and Health Convention, 1981, the List of Occupational Diseases Recommendation, 2002 (No. 194), the ILO List of Occupational Diseases (revised 2010), and the ILO code of practice on recording and notification of occupational accidents and diseases (1996).

147. The competent authority should establish a nationally consistent approach to collecting and reporting statistics on occupational accidents, injuries and occupational diseases. Where possible, the competent authority should promote digital notification systems to reduce the administrative burden.

148. Reporting, recording, notification and investigation of occupational accidents and diseases, ill health and dangerous occurrences are essential for preventive as well as reactive monitoring and should be undertaken to:

(a) provide reliable sex- and age-disaggregated information about occupational accidents, occupational diseases and dangerous occurrences at the enterprise, sectoral and national levels;

(b) identify major safety and health problems for both women and men workers and potentially vulnerable groups arising from forestry activities;

(c) define priorities of action;

(d) evolve effective and inclusive methods for dealing with occupational accidents and diseases, ill health and dangerous occurrences;

(e) identify possible gaps in safety and health legislation and regulation;

(f) monitor the effectiveness of measures taken to secure satisfactory levels of safety and health; and

(g) monitor trends over time and reveal new developments and issues.

149. Based on national laws and regulations or any other method consistent with national conditions and practice, the competent authority, in consultation with the most representative organizations of employers and workers, should:
(a) specify which categories or types of occupational accidents, injuries and diseases, ill health and dangerous occurrences are subject to requirements for reporting, recording and notification; these should comprise, as appropriate:

(i) all fatal accidents;
(ii) occupational accidents causing loss of working time, other than insignificant loss;
(iii) all occupational diseases;
(iv) to the extent possible, suspected occupational diseases;
(v) dangerous occurrences; and
(vi) commuting accidents;

(b) establish and apply uniform requirements and procedures for the site-level reporting and recording of occupational accidents, diseases, ill health and dangerous occurrences and suspected cases of diseases by physicians, health services and other bodies, as appropriate;

(c) establish and apply uniform requirements and procedures for the notification of prescribed sex- and age-disaggregated data, specifying in particular:

(i) the respective information to be notified to the competent authority, insurance institutions, labour inspectorates, health services and other authorities and bodies directly concerned, as appropriate;
(ii) the timing of the notification; and
(iii) the prescribed standardized form of notification to be used;

(d) make appropriate arrangements for the necessary coordination and cooperation between the various national authorities and bodies and when two or more employers engage in activities simultaneously at one workplace;

(e) make appropriate arrangements for guidance to be provided to employers and workers to help them comply with the legal obligations; and

(f) apply these requirements and procedures to all workers in all forestry-related activities, regardless of their employment status or the type of work performed.

150. For the purpose of prevention, recording, notification and, if applicable, compensation, a national list of occupational diseases should be established by the competent authority, in consultation with the most representative organizations of employers and workers, by methods appropriate to national conditions and practice and by stages, as necessary. This prescribed list of occupational diseases should:

(a) take account of the diseases enumerated in Schedule I to Convention No. 121, as amended in 1980; and

(b) comprise, to the extent possible, other diseases contained in Recommendation No. 194 and the ILO List of Occupational Diseases (revised 2010).

151. In accordance with national laws and regulations, the employer should ensure that arrangements are made within the worksite which are capable of satisfying the requirements to record and notify information in connection with:

(a) the national social insurance and/or compensation schemes in case of occupational injury and occupational disease; and
(b) the system for the recording and notification of occupational injuries, occupational diseases, ill health and dangerous occurrences.

152. Workers and their representatives in the worksite should be given appropriate information by the employer about the arrangements, according to national law and practice for:

(a) the recording and notification of information required for the payment of benefits or compensation in the case of occupational injury and occupational disease; and

(b) the reporting, recording and notification of occupational injuries and diseases, ill health and dangerous occurrences.

153. The employer, after consultation with workers and their representatives in the enterprise, should set up arrangements, in accordance with national laws and regulations, to enable all workers at the site to comply with the requirements to report:

(a) forthwith to their immediate supervisor, without detriment to themselves, any situation which they believe presents a danger to life or health; and

(b) any occupational injury, suspected case of occupational injuries and diseases, ill health and dangerous occurrences.

154. The employer should ensure that records of occupational injuries and diseases, ill health and dangerous occurrences and incidents are available and readily retrievable at all reasonable times. Such records should be maintained in accordance with national laws and regulations, where these exist, and should include contractor and subcontractor workers at the site. In the absence of national laws and regulations on recording at the level of the worksite, guidance should be drawn from this code, as well as from other relevant nationally and internationally recognized instruments. For long latency occupational diseases, records should be retained for such time as to recognize work-related associations.

155. In cases in which more than one worker is injured in a single occupational accident, a record should be made for each of the injured workers.

156. Workers’ compensation insurance reports and accident reports to be submitted for notification should be considered acceptable as records if they contain all the facts required for recording or are supplemented in an appropriate manner.

157. For inspection purposes and as information for worker representatives and health services, employers should prepare records disaggregated by sex and age within a period of time to be determined by the competent authority.

158. Workers should cooperate with the employer in carrying out the arrangements within the worksite for recording and notification of occupational accidents and diseases, ill health and dangerous occurrences.

159. The employer should give appropriate information to workers and their representatives concerning:

(a) the arrangements for recording; and

(b) the competent person(s) identified by the employer to receive and record information on occupational injuries and diseases, ill health and dangerous occurrences.

160. The employer should provide appropriate information to workers and their representatives on all occupational injuries and diseases, ill health and dangerous occurrences at the worksite as well as commuting accidents as appropriate, in order to help workers and employers reduce the risk of exposure to similar events.
161. All fatalities and serious occupational accidents should be notified to the immediate family and/or designated contact person of the accident victim, who should be informed as soon as possible, in compliance with national laws and regulations, to the competent authority, the labour inspectorate, the appropriate insurance institution or any other body:

(a) immediately after an occupational accident causing loss of life; and
(b) within a prescribed time for other occupational accidents.

162. Notification should be made within such time as may be specified and in prescribed specific standardized forms or formats, such as:

(a) an occupational accident/disease report for the labour inspectorate;
(b) a report for the statistics-producing body; or
(c) a single form which contains all essential sex- and age-disaggregated data for all bodies.

163. National laws and regulations should specify that notifications of occupational accidents and diseases include at least the following information to meet the requirements of labour inspectorates, insurance institutions and the statistics-producing body:

(a) occupational accident:
   (i) worksite and employer;
   (ii) injured person (name, address, sex and age, employment status, occupational role);
   (iii) type, nature and location of injury; and
   (iv) accident and its sequence (geographical location, date and time, action leading to injury, type of accident); and

(b) occupational disease:
   (i) worksite and employer;
   (ii) person affected by the occupational disease (name, address, sex and age, employment status, occupation at the time when the disease was diagnosed, employment history); and
   (iii) occupational disease (name, nature, harmful agents, processes or exposure, description of work, length of exposure, date of diagnosis and name of a competent health professional diagnosing).

164. National laws and regulations should provide for the specification of the relevant necessary information to be notified for commuting accidents.

6. Competence, information, instruction and training

165. Employers should ensure that workers are competent and that they should be adequately and suitably:

(a) informed of potential safety and health hazards and risks to which they may be exposed at the workplace or commuting to or from the workplace in accordance with national law and regulation; and
(b) instructed and trained in the measures available for the prevention and control of, and protection against, those risks.

166. No individual should be engaged in any work in a forestry operation without having received the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority, in collaboration with employers, should promote training programmes and competence assessment systems to ensure that all workers understand the safety and health related information.

167. The information, instruction and training should be given in a language understood by the worker using a combination of written, oral, visual and participative approaches to ensure the worker’s effective comprehension of the content. Innovative training approaches and tools, including through digital solutions, where practicable, should be considered.

168. National laws and regulations should prescribe:

(a) the nature and length of training or retraining required for various categories of workers in forestry operations; and

(b) that the employer has the duty to set up appropriate training schemes or arrange to train or retrain various categories of workers.

169. Every worker should receive effective and timely initial practical and theoretical instruction and training regarding the general safety and health measures common to the forestry operation before the commencement of duties and refresher trainings at appropriate intervals, or further to significant changes in risk levels for workers or in their functions.

170. The form and the content of such training should be devised and implemented in consultation with workers and their representatives. In accordance with the needs identified, training programmes on safety and health measures in forestry should include, but should not be limited to:

(a) pertinent aspects of OSH legislation, codes of practice and instructions on the prevention of occupational accidents and diseases and of any collective agreement, such as the obligations, responsibilities, duties and rights of competent authorities, employers, contractors, subcontractors and workers;

(b) the nature and degree of hazards or risks to safety and health which may occur, including any factors which may influence that risk, such as appropriate risk control measures;

(c) the correct and effective use of all prevention, collective protection measures, especially engineering and administrative controls and PPE, as well as the worker’s own responsibility for using such measures properly and the verification procedures to ensure their correct function;

(d) correct methods for the handling of substances, for the operation of processes and equipment, and for storage, transport and waste disposal;

(e) ergonomically correct methods for the handling of materials, equipment and tools;

(f) assessments, reviews and exposure measurements and the rights and duties of workers in this regard;

(g) the role of health surveillance, the rights and duties of workers in this regard and access to information;

(h) instructions on PPE, as necessary, including on its significance, correct use and limitations and in particular on factors which may show the inadequacy or malfunction of the
equipment, as well as the measures which may be required for the workers to protect themselves;

(i) easily identifiable hazard site-specific warning signs and symbols for hazardous ambient factors which may occur;

(j) procedures to be followed in an emergency, emergency measures, rescue, fire response and fire prevention, and first aid;

(k) appropriate hygiene practices to prevent, for example, the transmission of hazardous substances off site;

(l) cleaning, maintenance, storage and waste disposal, to the extent that these may cause exposure for the workers concerned; and

(m) safety and health practices emerging from utilizing digitalization, information and communication technology (ICT) and other new technologies, as well as more sustainable practices in forestry.

171. Training programmes should:

(a) be conducted by competent persons;

(b) include participants’ feedback and evaluation of their comprehension and retention of the training with a view to the continuous improvement of such training;

(c) be reviewed periodically by the joint safety and health committee, where it exists, or by the employer in consultation with workers and their representatives, and modified as necessary;

(d) be documented either physically or digitally; and

(e) have both theoretical and practical content.

172. Copies of the relevant safety and health rules, regulations and procedures should be available and accessible to workers either physically or digitally upon the commencement of and upon any change of employment.

173. Training should be provided to all workers at no cost and should take place during working hours. If this is not possible, the timing and other arrangements should be agreed upon between the employer, and workers and their representatives, taking into account the needs of workers with family responsibilities.

174. Before commencing work, on-site pre-work briefings should be completed which cover the scope of work, system of work, identification of key hazards and control measures to be used to reduce risks. Such briefings should be given to all workers on site, including contractors, subcontractors and other third parties.

175. Specialized instruction and training should be given to:

(a) managers and supervisors;

(b) drivers and operators of mobile plant, transport vehicles, and machinery or equipment of a specialized or dangerous nature;

(c) workers operating a chainsaw;

(d) workers engaged in climbing trees;

(e) workers handling or disturbing hazardous substances;

(f) workers exposed to significant vibration and noise levels;
(g) workers working at night;
(h) workers performing lone work;
(i) workers performing logging in storm-damaged areas;
(j) workers working in the tree nursery;
(k) firefighting workers; and
(l) other specialized categories of workers.

176. Wherever required by national laws and regulations, only drivers, operators or attendants holding a certificate of competence or licence should be employed to operate particular vehicles, machines, or other equipment.

177. Contracts for services should contain standard clauses requiring contractors to employ only workers and subcontractors who possess relevant skills and to comply with national laws and regulations establishing OSH requirements. When selecting contractors and subcontractors, their OSH management systems and their OSH record should be considered as important as other performance factors, based on the associated level of risk.

7. Safety requirements for tools, machines and equipment

178. Because of the wide variety of tools, machines and equipment used in forestry, this code cannot provide a detailed or exhaustive description of safety requirements on their selection or use, but general principles will be described.

179. To ensure that tools, machines and equipment are safe, key decisions have to be taken at the concept/design and manufacturing stages. This code does not cover these decisions, as the steps to be taken by designers and manufacturers of machines are not undertaken in forestry operations. It is, however, recommended that the guidance in the ILO code of practice on safety and health in the use of machinery should be followed by designers and manufacturers of tools, machines and equipment and taken into consideration by employers in consultation with workers and their representatives when choosing tools, machinery and equipment.

180. All tools, machines, software and equipment can be the source of diverse hazards and great attention should be paid to their design, manufacturing, planned and actual use, maintenance, cleaning and disposal to reduce associated risks to workers.

181. Guidelines for the safe use and operation of tools and machines in specific forestry operations are described in Part II of this code.

7.1. General requirements

182. All tools, machines and equipment used in forestry should be of adequate design and construction based on sound engineering practice taking into account health, safety and ergonomic principles, and they should:

(a) comply with safety and health requirements as prescribed in international or national standards and recommendations, wherever these are available;

(b) be used only for work for which they have been designed or developed unless a proposed additional use has been assessed as safe by a competent person or authority;
(c) be used or operated only by workers who have been trained, assessed as competent and/or hold appropriate skills certificates; and

(d) be operated and maintained according to the manufacturer's instructions.

183. Tools, machines and equipment should be tested and certified to inform both purchasers and users about meeting the requirements of national laws and regulations, and about the quality and suitability of the equipment for the purpose for which it will be used.

(a) Testing and certification should be performed only by institutions accredited by the competent authorities.

(b) Test results should be published and made available to dealers, distributors and purchasers.

(c) Certified equipment should be clearly marked, in accordance with the specific requirements of the competent authority.

(d) Employers should ensure that only certified equipment is used.

184. Appropriate checklists which are based on a complete assessment of all relevant criteria should be used when selecting tools, machines or equipment. This helps to create a healthy and productive working environment and ensure that the tool, machine or equipment is suitable for its intended purpose.

185. Employers, manufacturers or agents should provide comprehensive and clear instructions and information on all aspects of operator/user maintenance and the safe use of tools, machines and equipment. These should include information on safe systems of work and include any guarding requirements and requirements for personal protective equipment as well as the need for training.

186. Equipment should be designed to allow for convenient and safe maintenance and minor repair at the worksite. Workers may be trained to complete maintenance and minor repairs on machines and tools themselves in a safe manner. Where they lack this competence, a competent person should complete these tasks.

187. All tools, machines and equipment should be inspected before use to ensure all risk control measures are undamaged and fully operational.

188. If a tool, machine or a piece of equipment has been identified as unsafe, it should be removed from service and identified in a manner which will ensure it is not inadvertently returned to service until it has been made safe for use.

189. Facilities for repair and maintenance of tools and equipment should be provided, preferably close to shelters or housing facilities. Mobile shelter wagons with separate maintenance compartments for minor repair and maintenance work on chainsaws and hand tools are recommended.

190. In camps, provision should be made for workshop facilities with a good selection of appropriate maintenance tools, to allow maintenance and repair work to be carried out under safe conditions, without exposure to inclement weather conditions.

7.2. Hand tools

191. Hand tools for cutting and splitting should be manufactured from good quality steel which maintains its cutting edge and effectiveness with the minimum amount of maintenance.

192. The head of a tool for cutting and splitting should be fixed securely onto the handle with an effective device, for example a wedge, rivet or bolt.
193. Handles should be ergonomically designed and provide a secure grip and should be made of good quality wood or other materials suitable for this purpose.

194. The specification of tools, such as size, length of handles and weight, should be appropriate to cater for the needs of the work and the worker and the attributes of the user.

195. When not in use, sharp-edged tools should be sheathed with an appropriate cover.

196. Employers are generally responsible for providing tools and equipment to the worker. In circumstances where the worker agrees or chooses to provide their own equipment, the employer should take the necessary arrangements to ensure that the equipment is in a safe condition and does not present a risk to workers.

197. Workers have the right to refuse to work with a hand tool that they do not consider to be safe.

7.3. Portable hand-held machinery

198. The controls of machines such as chainsaws, brush saws and grass-cutters should be ergonomically placed and their function clearly marked.

199. The position and dimension of the handles should be comfortable for the operator in all normal working modes.

200. Levels of noise, vibration and harmful exhaust emissions should be as low as possible in line with the state of the technology and with national legislation. Biodegradable fuels and chain oils can significantly reduce risks from exposure to exhaust gases and spilling. Where appropriate, battery-powered portable machinery is lighter, quieter, and vibrates less, thereby diminishing exposure to exhaust emissions.

201. Machines should be as light as practicable to strike a balance between the machine size and power required for the task, while also preventing operator fatigue and musculoskeletal injuries.

202. All protective devices should be in place and regularly inspected for apparent defects. The engine-stopping device should have a positive action and be clearly marked.

7.4. Machinery, self-propelled or activated by prime mover

203. Machines should be equipped with shock-absorbent, fully adjustable seats for drivers and fitted with safety belts, in line with international and national standards.

204. Interior space and machine controls should be adequately designed and located to enable access to pedals and hand controls.

205. The means of access to and exit from machinery, such as steps, ladders and doors, should be designed to provide hand and footholds of a convenient height and spacing.

206. All pulleys, shafts, belts and fan blades should be securely guarded.

207. Machines should be equipped with appropriate protective structures, in accordance with international and national standards. These include:

(a) roll-over protective structure (ROPS), unless the machine has been designed to provide stability and prevention from roll-over;

(b) falling object protective structure (FOPS) for machinery working in standing trees (or where there is danger from falling material); and

(c) operator protective structure (OPS) to protect against chain shot and other objects that can penetrate the cabin.
208. Cabins should be conditioned to minimize noise exposure, hazardous temperatures and vibrations.

209. Engines should be equipped with a stopping device which is not self-returning, that is clearly marked and easily reachable from the operator's normal working position. The engine starter should be interlocked with the transmission or clutch to prevent the engine from starting if left in gear.

210. Parking brakes should be capable of keeping the machine and its rated load stationary on all slopes it is working on.

211. Exhaust pipes should be equipped with spark arresters. Engines equipped with turbochargers do not need spark arresters.

212. First aid kits and fire extinguishers should be available on every machine, and the operators should be trained in their use.

213. Machines should be equipped with all-wheel drive where required for safe performance.

214. Machines for hauling timber should be so designed that a minimum of 20 per cent of the total axle weight is located on the steering axle during operation.

215. While a machine is being serviced or repaired, the engine should be switched off unless required when carrying out the repair or adjustment. In this case preventive and protective measures should be adopted to eliminate or, if not possible, minimize any risks.

216. Before working on the hydraulic system of a machine or a part powered by the system, such as a harvester head, the operator should ensure that the machine is switched off, the hydraulic pump is disengaged, hydraulic pressure is released, and all elements are chocked to prevent movement or lowered safely to the ground.

217. Lubrication and hydraulic oils which are not toxic, which do not provoke allergies and skin reactions and which are environmentally benign, such as biological oils, should be used if feasible.

218. No person other than the operator should ride on a machine unless it is legally permitted and a seat is provided for that purpose.

219. The operator should keep the safety belt correctly fastened when driving the machine.

220. Safe facilities for battery charging should be provided.

Safe immobilization of vehicles and prevention of vehicle roll-away

221. Vehicles that are not immobilized properly can pose safety risks to workers.

222. Employers should manage the risks of vehicle roll-aways by:
   (a) eliminating the risk where possible;
   (b) if not possible, minimizing the risk, for example by:
      (i) isolating the vehicle from workers;
      (ii) parking on level ground;
      (iii) using a fail-safe automatic braking system; or
      (iv) using wheel chocks.
7.5. Winches and chokers

223. Winch controls should be designed to be operated from inside the cabin or from another safe position.

224. Winches should be designed and fitted to the base machine as close to the ground as possible, in order to maintain a low centre of gravity and to enhance stability.

225. Winch cables for forestry use should incorporate a safety factor of at least twice the pulling capacity of the winch; for example, a three-tonne winch should be fitted with a cable of at least a six-tonne notional breaking strain. The same requirement also applies to chokering equipment.

226. Chokering systems should allow logs to be pulled in freely.

227. Good communications between members of the crew are essential, preferably by use of a two-way radio system or other effective means of communication. Clear and unmistakable visual or acoustic signals should be agreed upon; any signal that is not understood means “STOP”.

7.6. Cable cranes

228. These systems require highly specialized technical knowledge for planning, installation and operation. Only competent persons should be assigned to operating cable cranes.

229. Winches and carriages should be equipped with an efficient braking system.

230. Technical specifications and instructions should be available and complied with, especially concerning the angles for cables and guy ropes, anchors and the maximum safe load. A factor of safety should be incorporated into the specification of both static and moving cables (see also Chapter 14 of this code).

231. The employer should ensure these systems are subjected to a thorough examination and a performance test by a competent person as prescribed by manufacturing specifications, standards or national laws or regulations. Results of such examination and tests should be documented by the competent person in a logbook at the premises and should be available for inspection by the competent authority.

8. Personal protective equipment (PPE)

8.1. General provisions

232. Where adequate collective protection measures against the risk of accident or ill health, including exposure to adverse conditions, cannot be ensured by other means, such as eliminating the hazard or minimizing the risk, suitable and sufficient PPE, in line with a risk assessment, and in consultation with workers and their representatives, should be used by the workers and provided and maintained, and replaced by the employer, without cost to the workers, as may be prescribed by national laws and regulations. The same level of protection should be provided to all workers performing the same work.

233. PPE should comply with relevant national standards and criteria approved or recognized by the competent authority, taking into account as far as possible ergonomic principles and environmental factors, including climate and terrain conditions.

234. The minimum requirements for mandatory PPE at the forestry operation should be established and communicated with appropriate signage.
235. Periodic breaks from wearing PPE that results in undue stress should be introduced when required to be worn by workers.

236. Employers should provide workers with appropriate information, instruction and training to enable them to properly use, maintain and store PPE as well as ensuring its proper use.

237. Suitable facilities and working time should be provided for changing and removing PPE in a safe manner.

238. A competent person having a full understanding of the nature of the hazard and the type, range and performance of the protection required should:
   (a) select suitable PPE, which is ergonomically designed and which takes into account the characteristics of the wearer and ensures a good fit; and
   (b) arrange that PPE is properly stored, maintained, and replaced before any expiration date is reached, and, where necessary, disinfected or sterilized at suitable intervals, in accordance with guidance set or otherwise recognized by the competent authority.

239. Workers should:
   (a) make proper use and take good care of the PPE provided; and
   (b) examine PPE before each use to ensure that it is in good condition, and if it is not, communicate for it to be replaced or repaired as necessary by the employer, at no cost to the user.

240. PPE should be issued as new to an individual worker and not interchanged unless it has been maintained, examined and properly sanitized.

241. Employers should provide for the laundering, cleaning, disinfecting and examination of protective clothing or equipment which has been used and may be contaminated by hazardous materials that are detrimental to health before reissuing the clothing or equipment.

242. It is desirable to limit sun exposure by wearing adequate clothing (including sunglasses), and by the use of protective sunscreen on exposed skin. These measures should be provided by the employer at no cost.

8.2. Protective clothing

243. Workers should wear appropriate protective clothing provided by the employer.

244. Protective clothing should be of adequate design and fit, allowing freedom of movement for the worker to perform their tasks. It should be waterproof when used in adverse weather conditions and adequate for the environment in which it will be worn. For work in hot and dry climates, appropriate clothing should be used to avoid excessive thermal insulation and allow respiration. Adequate protective clothing should be provided where there is a risk of UV radiation or biological hazards, such as poisonous plants, animals and infections.

245. High-visibility and reflective clothing of a colour that contrasts with the forest environment should be worn, provided clean and in good repair to ensure that workers are clearly visible.

246. When working with chainsaws, appropriate leg, groin, arm and chest protection should be worn that provides protection against chainsaw cuts. This protective clothing should be replaced when they are exposed to any chainsaw impact and should not be reused, in accordance with manufacturers’ specifications.
247. The employer should seek competent professional advice with regard to the selection of chemical protective clothing. Chemical protective clothing should properly fit the individual who wears it. Workers and their representatives should be consulted with regard to comfort and fit of PPE.

8.3. Head protection

248. Safety helmets or hard hats in highly visible colours should be worn by all persons at all relevant times due to the potential for head injury from falling or flying objects such as branches and trees, or due to striking against objects or structures. For work where there is no tree canopy or other overhead hazards, such as in nursery or planting, wide hats or head covers with visors to prevent heat or sun radiation exposures should be provided where necessary.

249. In general, the shell of a helmet should be of one-piece construction, with adjustable cradle/suspension straps inside to support the helmet on the wearer’s head and, where appropriate, particularly for persons working overhead, a chinstrap should be fitted to prevent the helmet from falling off. The cradle and chinstrap should be properly adjusted to ensure a snug fit as soon as the helmet is put on.

250. Any helmet that has been subjected to a heavy blow, even if there are no evident signs of damage, should be replaced.

251. If splits or cracks appear, or if a helmet shows signs of ageing or deterioration of the cradle/suspension straps, the helmet should be replaced as per the manufacturer’s instructions.

252. Helmets should be periodically checked, including for deterioration due to UV exposure and replaced as appropriate.

253. Where there is a risk of contact with exposed conductive parts, only helmets made of non-conducting material should be used.

254. In addition to safety, consideration should also be given to the physiological aspects and comfort for the wearer. The helmet should be as light as possible, the harness should be flexible and should not irritate or injure the wearer and a sweatband should be incorporated.

8.4. Face and eye protection

255. Safety goggles, shields or other type of PPE for face and eyes should be used where the eyes and face are exposed to flying particles, dust, fumes, insects or chemical hazards.

256. Ordinary prescription (corrective) glasses, unless manufactured to a safety standard, do not afford protection. Glasses designed to be worn over ordinary prescription glasses should be selected according to the hazards to be protected against.

257. With the use of face and eye protectors, due attention should be paid to comfort and effectiveness.

8.5. Hand, leg and foot protection

258. Hands, legs and feet should be protected against biological, physical, chemical and other hazards and should be suitable for the work tasks and the terrain.

259. Gloves should be used in any activity that exposes the hands to hazards including rough or sharp surfaces and any type of chemical use. When working with chainsaws, appropriate hand protection should be worn that provides protection against chainsaw cuts. These should be replaced when they are exposed to any chainsaw impact and should not be reused.
260. Footwear of an appropriate type with toecaps, midsoles and slip-resistant outsoles should be used in workplaces where there is a risk of exposure to adverse conditions likely to cause injury, such as falling objects, moving vehicles, hot or hazardous substances, sharp-edged tools and slippery, wet or ice-covered surfaces. Sandals and similar footwear should not be worn when working.

261. Knee protectors may be necessary, especially where work involves kneeling.

8.6. Hearing protection

262. Workers who by the nature of their duties are exposed to high noise levels, in terms of level of intensity or duration of exposure, should be provided with, and should wear, ear protectors. Various types of hearing protectors are available, including earplugs and earmuffs, each of which may be of different design standards. Protectors should be of a type recommended as suitable for the particular circumstances and climatic conditions. Hearing protectors should be made available at the entrance to the noisy space. Noisy areas should be indicated and warning signs displayed at the location, where appropriate.

263. Hearing protectors should reduce exposure to noise below national or international recognized limits, be comfortable, and users should be trained to use them properly. Special attention should be paid to the possible increased risk of accidents due to the use of hearing protectors. Hearing protection reduces the capacity to locate sound sources and prevents warning signals from being heard. This is especially true for workers with considerable hearing loss.

264. Two-way radio headsets integrated in the hearing protectors facilitate communication during operations with high noise levels.

265. No one type of hearing protection is suitable for all persons. Those wearing hearing protectors should be able to choose from alternative products that meet the attenuation criteria.

266. Hearing protectors only work well if they are worn correctly and are well maintained. Any other PPE worn with them should be compatible in order to not jeopardize the fit. Good maintenance consists of cleaning, changing replaceable parts such as cushions, and monitoring the state of the hearing protector.

267. If earplugs are used as hearing protection, special attention should be paid to the proper fitting technique.

8.7. Respiratory protective equipment

268. Where workers are likely to be exposed to airborne substances that may damage their health, the employer should conduct a risk assessment to identify appropriate risk control measures to reduce the risk to an acceptable level. If respiratory protective equipment is required in addition to other control measures, it should be appropriate for the identified hazardous substances and a correct fit (ensured through face fit tests).

9. Welfare

9.1. General provisions

269. All workers should be provided reasonable opportunities in paid work time to make use of welfare facilities.
270. At or within reasonable access to the worker on every forestry operation site, the following facilities should, depending on the number of workers and the duration of the work, be provided for workers, kept clean and maintained, and comply with the requirements of the competent authority:

(a) adequate supply of wholesome drinking water of suitable temperature;
(b) sanitary and washing facilities or showers;
(c) facilities for changing and for the storage and drying of clothing;
(d) facilities for taking meals and for taking shelter during interruption of work due to adverse weather conditions;
(e) waste disposal; and
(f) childcare facilities, living accommodation and facilities for workers away from their homes according to national practices, where relevant.

271. Correct and regular cleaning and maintenance of welfare facilities should be ensured.

9.2. Drinking water and nutrition

272. All drinking water should be from a source approved by the competent authority and tested regularly. Where such water is not available, the competent authority should ensure that the employer takes the necessary steps to make any water to be used for drinking fit for human consumption.

273. Drinking water for common use should only be stored in closed containers from which the water should be dispensed through taps or faucets.

274. If drinking water has to be transported to the worksite, the transport arrangements should be made.

275. The employer should ensure transport tanks, storage tanks and dispensing containers should be designed, used, cleaned and disinfected at suitable intervals.

276. Water that is unfit to drink should be conspicuously indicated by notices prohibiting workers from drinking it.

277. A supply of drinking water should never be connected to a supply of water that is unfit to drink.

278. To reduce the risk of communicable diseases, the communal use of glasses or drinking water receptacles should be prohibited.

279. Bearing in mind that dehydration quickly reduces physical and mental ability, thus reducing productivity and increasing the risk of accidents, sufficient supplies of safe drinking water should be available at the worksite. For physical work in hot climates, up to 1 litre per hour may be required.

280. Where meals and other food supplies are made available to the workers by the employer, the food should be nutritious, balanced and hygienic, its price should be reasonable and it should be provided without profit to the employer.

9.3. Facilities for food and drink

281. In appropriate cases, depending on the number of workers, the duration of the work and its location, clean, hygienic and safe facilities for obtaining, correctly storing, serving or preparing food and drink at or near a forestry operation should be provided, if not otherwise available.
282. The consumption of food or beverages in areas where there is a likely exposure to hazardous substances should be prohibited.

283. The persons in charge of the food services in a camp should be skilled in nutrition, sanitation and food-handling, should be licensed by a competent authority, in accordance with national law and practice, and should be inspected regularly.

9.4. Sanitary and washing facilities

284. Adequate sanitary and washing facilities, including hot and cold or warm running water, together with soap or other cleaning materials and single-use towels or other drying equipment, should be provided by the employer. Their number and standard of construction and maintenance should comply with the requirements of the competent authority.

285. Sanitary and washing facilities should be conveniently accessible but situated so that they are not themselves exposed to contamination from the workplace.

286. Suitable toilets should be provided by the employer with toilet paper, as appropriate a bidet, hand-washing facilities and soap and sanitary products.

287. Separate and accessible female and male facilities, inclusive of persons with disabilities with a door that can be locked, preferably in the vicinity of changing rooms, should be provided.

288. Where workers are exposed to skin contamination by poisonous, infectious or irritating substances, or oil, grease or dust, there should be a sufficient number of appropriate washing facilities or showers supplied with hot and cold water, and appropriate cleaning products.

9.5. Facilities for changing and storing clothing

289. Facilities for changing and storing clothing should be provided for workers at easily accessible places and not be used for any other purpose.

290. These facilities should contain areas for drying wet clothes and for hanging clothing, including, where necessary and to avoid contamination, suitable lockers separating work clothes from street clothes.

291. Suitable arrangements should be made for disinfecting these facilities and lockers, in conformity with the requirements of the competent authority.

292. Facilities for changing and storing clothing should be so situated and designed as to prevent the spread of contamination from protective clothing to personal clothing and from one facility to another.

9.6. Childcare facilities

293. The competent authority should formulate and implement laws, regulations and policies to promote and encourage the provision of affordable day-care facilities and other supporting family or social services to enable parents to combine family obligations with work responsibilities.

294. In cases where childcare is facilitated or provided by the employer, such facilities should be located away from areas used for storage of hazardous substances, loading and unloading, movement of heavy machinery and other dangerous areas.

295. Childcare facilities should comply with building, fire-safety and other relevant standards established by the competent authority.
9.7. Living accommodation

296. Suitable living accommodation should be made available for workers, in accordance with national standards, at forestry operations which are remote from their homes, ensuring structural safety and reasonable levels of decency, hygiene and comfort, where adequate transportation between the operation and their homes or other suitable living accommodation is not available. These facilities should ensure adequate security and privacy for all workers.

297. Where collective housing is provided for workers who are single or are separated from their families, the competent authority should establish housing standards that provide, at a minimum, for:

(a) a separate bed for each worker;
(b) separate accommodation for males and females;
(c) a separate locker for keeping personal belongings;
(d) an adequate supply of wholesome drinking water;
(e) adequate sanitary and washing facilities;
(f) adequate ventilation and, where appropriate, heating and/or cooling;
(g) canteens; and
(h) rest and recreation facilities.

298. The competent authority, if appropriate, should identify the agency or agencies responsible for providing such living accommodation and should specify the minimum standards for housing, including for its construction material, fire safety, minimum size and the layout of accommodation, cooking, washing, storage, water supply and sanitary facilities.

299. In cases where housing is provided by the employer, the accommodation should comply with minimum housing standards established by the competent authority in the light of local conditions.

300. As far as practicable, sleeping rooms should be arranged so that shifts are separated and no workers working during the day share a room with workers on night shifts.

301. In cases where housing is provided by the employer, the premises should be inspected at regular intervals to ensure that the accommodation is clean, habitable and maintained in a good state of repair, and that smoke detection and fire alarm systems, emergency lighting, fire-extinguishing equipment and exit doors are operational. There should be at least two exit doors on each floor and on opposite sides of the building, and these should never be locked from the outside.

302. Workers’ accommodation should be situated so as to minimize the risk of flooding, wildfires, or other natural hazards.

303. Further information about workers’ housing can be found in ILO Helpdesk Factsheet No. 6: Workers’ housing (2009).

9.8. Shelters

304. Shelters should be made available for protection from inclement weather and for spending breaks, washing, taking meals and with wholesome drinking water and facilities for drying and storing clothing, at or within easy access of the worksite.
305. Shelters should be maintained at a safe and healthy temperature, taking into account climate conditions in hot climates; shaded rest areas should be available at all worksites. Where not possible, vehicles should be used as shelters.

10. Health hazards

10.1. General requirements

306. For tasks which by their very nature expose workers to hazards arising from the use or presence of chemical, physical or biological agents, or to ergonomic or psychosocial risks, including risks arising from adverse climatic conditions, appropriate preventive measures should be taken to avoid any danger to the safety and health of workers.

307. These preventive measures should be determined through risk assessment and should prioritize avoidance of exposure through elimination of the hazard to health from the workplace. If this is not possible, then prevention should be achieved in line with the hierarchy outlined in paragraph 86.

308. The employer should make arrangements for the identification and assessment by competent persons of health hazards presented by the conduct of different operations and use of machinery, equipment and substances at the forestry operation and take appropriate preventive measures against the identified health risks in conformity with the national laws and regulations.

309. The employer should design production processes and reward systems so they do not promote injurious work.

10.2. Hazardous substances

310. In the use, storage and transport of materials that contain hazardous substances and in the removal and disposal of waste, the employer should ensure that the safety and health of workers and of the public and the preservation of the environment are safeguarded as prescribed by national laws and regulations.

311. The competent authority should provide information to parties in the forestry sector on health risks associated with hazardous substances including exposure limits. The competent authority should keep this information under review using the results of international scientific research as specified by the Chemicals Convention, 1990 (No. 170).

312. National laws and regulations should require that the manufacturers, importers and suppliers of hazardous products used in forestry should package them in clearly marked and labelled containers listing the ingredients and the appropriate hazard warnings and instructions on their use. They should also ensure that chemical safety data sheets are prepared for such hazardous chemicals and provided to employers. The safety data sheets should detail information on the products, in the appropriate language, on associated health risks and on the precautions to be taken, containing the following core information:

(a) identification of manufacturer, product and ingredients;

(b) physical and chemical properties and information on the health effects, physical hazards, environmental impact and relevant exposure limits; and

(c) recommendations concerning safe work practices; transport, storage and handling; waste disposal; PPE; first aid, fire response and chemical spills. The Globally Harmonized System of
Classification and Labelling of Chemicals provides guidance on the preparation of labels, safety data sheets and the provision of information to workers.

313. The employer should ensure that all containers of hazardous substances used at work are clearly marked and labelled as described above. Safety data sheets should be made readily available on site for all hazardous substances being used or stored, in forms and languages which workers easily understand.

314. Hazardous substances should be handled under conditions prescribed by national laws and regulations or by the competent authority. The employer should ensure that workers are protected from hazardous substances in the working environment and are trained on information on the hazards of the chemicals and the measures to be used to protect themselves.

315. The competent authority, in consultation with the most representative organizations of employers and workers, should determine which hazardous substances should be prohibited from use in forestry sector.

316. The use of hazardous substances should be minimized where possible. Workers handling hazardous substances should be instructed and supervised by the competent person, with adequate precautions and, where appropriate, ensuring adequate PPE is used. Additional measures should be taken to protect workers who are pregnant or breastfeeding from hazardous exposure.

317. Aerial application of hazardous substances should be minimized, and when used must meet the requirements set by national or international laws, regulations and guidance.

10.3. Heat stress, cold and wet conditions

318. Whenever climatic conditions are such that they can lead to impairment of health or extreme discomfort, preventive measures should be taken by the employer, such as:

(a) proper design of the workload and workstation, with special regard to workers in cabins, and command or driving operations;

(b) training workers and their representatives and supervisors to enable detection of early signs of disorders and the preventive steps to be taken, including suitable liquid intake and dietary requirements;

(c) supply of PPE;

(d) routine medical surveillance;

(e) acclimatization to a hot/cold environment, including major changes in climatic conditions;

(f) supervision so that workers can be withdrawn from adverse conditions if symptoms of heat/cold stress occur; and

(g) limiting work activities and providing for rest periods during hazardous climatic conditions such as extreme heat or cold, taking account of wind speed and other adverse weather factors.

319. Employers should be aware of, and workers should be trained in recognizing, the symptoms that may precede heat exhaustion or heat stroke, and in basic first aid in case these symptoms occur.

320. When working in hot conditions, preventive measures to avoid heat stress should include, among others, work–rest cycles in cool areas and the employers should provide well-shaded rest areas and make available an adequate supply of drinking water with the addition of proper electrolytes, where appropriate. When working in cold conditions, preventive measures should include
adapting work activities for working in cold temperatures, providing rest periods in heated areas, and providing appropriate PPE.

321. Workers in extremely cold/hot working environments should be able to handle equipment and installations, fire response and emergency preparedness in those conditions.

10.4. Exposure to solar radiation

322. Work performed outdoors can expose workers to solar radiation which poses the risk of diseases and sunburn. Employers should reduce the risk by adapting periods of exposure by the provision of shade and providing workers with adequate protective measures.

323. For the purpose of early detection of skin diseases such as cancer, workers continually working under solar exposure, where appropriate, should be under periodic medical surveillance and encouraged to seek medical advice.

10.5. Noise and vibration

324. The competent authority should set standards for the maximum noise dose to prevent hearing impairment in the working environment.

325. Employers should undertake assessments of noise and vibration exposure, and provide protection for workers from the harmful effects of noise and vibration from machines and processes, with reasonable accommodation for workers who are pregnant or breastfeeding by measures including:

(a) replacing hazardous machines and processes by less hazardous ones, such as replacing petrol-powered chainsaws and other handheld tools by battery-powered or electric ones;

(b) ensuring appropriate maintenance of machinery;

(c) taking steps to minimize excessive levels of noise and vibration which may impair workers’ health, such as by reducing the exposure time;

(d) providing PPE to reduce the risks from noise and vibration.

326. Employers should prioritize the reduction of the duration of workers’ exposure to noise and vibration, including in tasks such as manual felling, bucking, working in landing, or when operating machinery in processes in which the level and duration of the exposure of workers nears the exposure limits, as established by the competent authority.

327. Workers who may be, or have been, exposed to significant noise or concomitant exposure to ototoxic chemical agents and/or whole body vibration should receive initial and further regular audiometric testing and be informed of the results of their audiometric tests.

328. Workers who may be, or have been, exposed to significant vibration levels should receive regular and suitable checks including whole body and hand-arm vibration, and for health effects including Raynaud's disease and carpal tunnel syndrome by a competent person to identify any signs and symptoms of ill health.

10.6. Biological hazards

329. National laws and regulations should ensure that risks, such as those of infection, allergy, toxicity, disease or accident due to biological hazards including poisonous plants, are, so far as is reasonably practicable, controlled when the appropriate measures of protection are taken.
330. The competent authority should establish requirements for the protection of workers against occupational exposure to biological hazards. Such requirements should be based on sound scientific criteria and accepted international practices noting the ILO list of diseases associated with biological hazards included in Recommendation No. 194.

331. The competent authority should make available information on the prevention of biological hazards and provide appropriate support with regard to public health and occupational health measures.

332. Employers, in consultation with workers and their representatives, should:
   (a) have systems in place to identify biological hazards and evaluate the risks with regard to the safety and health of workers arising from these hazards. Risk assessments should address specific vulnerabilities, including gender, age and disability and be reviewed and updated, where necessary;
   (b) ensure, so far as is reasonably practicable, that where the assessment reveals a risk to workers' safety and health from a workplace biological hazard, that such risk of exposure be minimized through appropriate measures of protection; design of work processes and engineering control measures to prevent or minimize the release of biological agents; collective and individual protection measures, including vaccines as appropriate and available, and hygiene measures; and warning signs and testing, as needed.

333. The employer should provide instructions at the workplace and display notices, which should include the procedure to be followed in the case of a serious outbreak, accident or incident involving the handling of a biological substance or agent.

334. The employer should immediately inform workers and their representatives when an accident or incident occurs that has resulted in the release of a biological substance or agent and that could cause severe human infection and illness, specifying the causes thereof and the measures taken or to be taken to rectify the situation.

335. Workers should immediately report any accident or incident involving the handling of a biological substance or agent to the employer or to the safety and health officer(s).

336. In accordance with national laws and regulations, taking into consideration the ILO Technical guidelines on biological hazards in the working environment (2023), the employer should notify the competent authority in case of any accident or incident involving biological agents. All cases of diseases or death identified in accordance with national laws and regulations to be the result of occupational exposure to biological agents should be notified to the competent authority and, where appropriate, relevant public health agencies.

337. Workers and working environments at risk of exposure to a biological substance or agent should be subject to relevant health surveillance in line with the requirements in Appendices I and II to this code and as prescribed by national laws and regulations.

338. If a worker is found to be suffering from an infection or illness that is suspected to be the result of exposure to a biological agent, health surveillance should be offered to other workers who have been similarly exposed.

339. All information retention and disclosure should take worker privacy and data protection requirements into account.

340. If workers have allergy to particular allergen, they should communicate it to their employer.

341. There should be no stigmatization and discrimination based on the medical records of the worker.
Injuries or diseases due to animals and insects

342. Employers should assess and map the risks from animals and insects, bearing in mind the local environment and probability of workers being injured by animals and insects during the course of their work.

343. Employers should, to the extent possible, use engineering controls to manage worker exposure, ensuring their compliance with local and national safety standards and in accordance with accepted international practice.

344. The employer should make workers aware on the ways to prevent and treat snake, arachnid and insect bites or infections or related hazards when the probability of exposure is significant or when the situation of vector is changing and the conditions are allowing for the expansion of hazardous animals or invertebrates into an area.

345. Employers should develop written emergency management protocols for use in the event of workers' injuries caused by wild animals. First aid personnel and other workers should be trained on the protocol.

10.7. Ergonomics

346. The competent authority, after consulting the representative organizations of employers and workers concerned, should establish safety and health considerations for repetitive work, working postures, work pace, work demand, work volume, physical load, and the handling and transport of materials, particularly for manual handling. Such considerations should be based on risk assessment, technical standards and medical opinion, taking into account all the relevant conditions under which the work is performed, in accordance with national law and practice.

347. To the extent possible, the task should be adapted to the worker, and jobs and tasks with unacceptable ergonomic problems should be eliminated by redesigning work procedures, workstations, tools and machinery. Any new equipment should meet ergonomic design principles, including ease and safety of operation and adjustability to the user.

348. If complete elimination is not practicable, the time that workers are required to spend in such conditions should be as short as possible in conjunction with sufficient rest periods, job rotations and changes in postures, with reasonable accommodation for workers who are pregnant or breastfeeding.

349. Employers should have a process in place to ensure effective contribution to measures for vocational rehabilitation for workers suffering from ergonomic injuries.

350. Employers should ensure that workers who are exposed to worksite risk of musculoskeletal injury or disease receive adequate information, instruction and training in safe work techniques which take into account differences between women and men before being assigned to job tasks. Workers should be:

(a) informed about common musculoskeletal disorders and their signs and symptoms;
(b) informed about the need to routinely adopt “neutral” body positions;
(c) trained in proper lifting techniques;
(d) encouraged to properly adjust seating and working positions;
(e) informed about the risk associated with repetitive lifting and lowering of tools, forest products and other material, etc.;
(f) informed of the risk associated with pushing or pulling heavy loads/objects;
(g) informed of the risk associated with repetitive and forceful use of non-neutral posturing of the hand or wrist with both applied upper-bound hand force either to the tool or to the plant and speed of hand/wrist movement;
(h) instructed in the correct handling and use of hand tools with a light, but safe grip;
(i) instructed in the proper fitting, use, and maintenance of PPE;
(j) encouraged to report any pain, discomfort, numbness or tingling to the employer without fear of discrimination and informed about the health consequences of failing to do so; and
(k) informed about the necessity of breaks when conducting movements which present a risk, to ensure a rest and recuperation period.

351. When buying new equipment or machinery, employers should take into account technical evolution and select equipment which presents less risks for the workers.

10.8. Psychosocial risks and work-related stress

352. Psychosocial hazards are hazards that, among others:

(a) arise from:
   (i) the design or management of work;
   (ii) the work environment;
   (iii) equipment at a workplace;
   (iv) workplace interactions or behaviours;
   (v) violence and harassment; or
   (vi) decent work deficits;

(b) may cause psychological and physical harm.

353. Employers are responsible for eliminating the risks of psychosocial harm in the workplace, or, if that is not possible, minimizing the risks so far as is reasonably practicable.

354. A psychosocial risk assessment should be carried out and written risk control measures drawn up for all operations, in accordance with national laws and regulations.

355. The psychosocial risk assessment and control measures should be developed in consultation with workers and their representatives and there should be a demonstrated commitment from all parties. It should cover roles and responsibilities of managers, professional staff, contractors and subcontractors.

356. The psychosocial risk assessment should consider decent work deficits, isolated work, high work demands, need for breaks, and work-related stress and fatigue, resulting from features of the work and the workplace.
11. Labour protection

11.1. Employment and social security

357. The competent authority should ensure that all workers in forestry and their dependants are statutorily and effectively covered by national social security systems and schemes and that they are entitled to the benefits, in cash and in kind, provided thereunder.

358. The social security of workers should be protected and guided by the Social Security (Minimum Standards) Convention, 1952 (No. 102), and other relevant ILO social security standards in all regards pertinent to occupational safety and health.

359. Where the entire range of statutory social security benefits is not applicable to all forestry workers or to their dependants, the competent authority should seek to ensure that all persons in need have access to essential healthcare and basic income security, guided by the Social Protection Floors Recommendation, 2012 (No. 202).

360. Employers should, as prescribed by national laws and regulations, or in accordance with national conditions and practice, ensure that:
   (a) every worker has an employment contract;
   (b) every worker is registered with the social security system;
   (c) coverage is provided, such as benefits in case of injury, sickness, temporary and permanent disability through workers’ compensation in the event of occupational accidents and diseases, and compensation for survivors in the event of work-related death, for all workers in forestry, irrespective of their employment and social security status; and
   (d) contributions to workers’ compensation schemes are paid.

11.2. Maternity protection

361. In accordance with the provisions of the Maternity Protection Convention (No. 183) and Recommendation (No. 191), 2000, the competent authority should adopt regulations, policies and measures that provide for the safety and health aspects in relation to maternity protection.

362. Employers should inform themselves about applicable international instruments, national laws and regulations and the recommendations of the competent authority, and should formulate and implement, in consultation with workers and their representatives, a workplace policy on maternity protection.

363. The employer should take measures to ensure that workers who are pregnant or breastfeeding are not obliged to perform work that has been determined to be prejudicial to the health of the mother or the child or where an assessment has established a significant risk to the mother’s health or that of the child.

364. The employer should assess workplace risks related to the safety and health of workers who are pregnant or breastfeeding and their children. Where significant risk has been identified, the employer should take measures to provide, on the basis of a medical certificate, as appropriate, an alternative to such work in the form of:
   (a) elimination of risk;
   (b) an adaptation of conditions of work;
(c) a transfer to another post, without loss of pay, when such an adaptation is not feasible; or
(d) paid leave, in accordance with national laws, regulations or practice, when such a transfer is not feasible.

365. When adapting conditions of work, the employer should take particular measures in respect of:
(a) arduous work involving manual lifting, carrying, pushing or pulling of loads;
(b) work involving exposure to biological, chemical or physical agents which represent a reproductive health hazard;
(c) work requiring special equilibrium; or
(d) work involving physical strain due to prolonged periods of sitting or standing, to extreme temperatures, or to vibration.

366. The employer should ensure that workers who are pregnant or breastfeeding should not be obliged to do night work and shift work if a medical certificate declares such work to be incompatible with their pregnancy or breastfeeding.

367. The employer should allow a worker to leave her workplace, if necessary, after notifying her employer, for the purpose of undergoing medical examinations relating to her pregnancy.

368. The employer should provide maternity leave in accordance with national laws, regulations or practice. To the extent possible, measures should be taken to ensure that the worker is entitled to choose freely the time at which she takes any non-compulsory portion of her maternity leave, before or after childbirth.

369. In accordance with national laws and regulations, the employer should ensure that cash and sickness benefits shall be provided to workers who are absent from work on leave both in respect of maternity leave and leave in case of miscarriage, complication or illness.

370. The employer should not terminate the employment of a worker during her pregnancy or absence on leave or during a period following her return to work, as prescribed by national laws or regulations. She should be guaranteed the right to return to the same position or an equivalent position paid at the same rate at the end of her maternity leave.

371. The employer should respect the right of breastfeeding mothers to one or more daily breaks or a daily reduction of hours of work.

372. When practicable, the employer should establish the facilities for nursing and for storing expressed milk under adequate hygienic conditions at or near the workplace.

11.3. Working hours

373. Any OSH policy or plan should provide for an assessment of reasonable working hours in respect to the health and safety conditions of the site, which should not exceed the number prescribed by national laws and regulations or approved by labour inspectorates or in collective agreements, where applicable.

374. Working hours should be arranged so as to provide adequate periods of rest, which, as prescribed by national laws and regulations or approved by labour inspectorates or through social dialogue, where applicable, should include:
(a) short breaks during working hours, especially when the work is strenuous, dangerous, monotonous, requires high concentration, or takes place in adverse weather conditions, to enable workers to recover their vigilance and physical fitness;
(b) sufficient breaks for meals and drinks and biological needs;
(c) rest between work shifts;
(d) weekly rest; and
(e) annual leave.

375. When the worksite is remote or mobile, work travel should be considered part of the working hours in alignment with national laws and regulations.

376. Limiting overtime should be taken into consideration to reduce workers' exposure to fatigue and other workplace hazards.

377. Any changes in work schedules that could affect OSH should be preceded by full consultation with the workers and their representatives.

11.4. Night work and lone working

378. Where night work is required, the employer should take the necessary measures to ensure that risks do not exceed those in daytime operations, in particular managing lighting and avoiding, as far as possible, the isolation of workers.

379. Specific measures required by the nature of night work should be applied progressively. Such measures should comprise:
   (a) health assessments to identify and monitor health problems associated with night work; and
   (b) compensation in the form of reduced working time, premium pay or similar benefits and appropriate social services.

380. If an operation becomes unsafe because of inclement weather conditions or darkness, work should be discontinued until conditions change or, where applicable, appropriate mitigation measures are implemented to allow safe operations.

381. Where work during darkness is unavoidable, the worksite should be provided with enough lighting to maintain normal safety standards.

382. Lone working should be avoided. If it is necessary, the employer should, in consultation with workers and their representatives, take appropriate measures for the protection of workers working alone or in isolation, including with transportation and reliable communication means.

383. A risk assessment should be performed for those who work alone or in isolation in consultation with workers and their representatives to ensure that suitable welfare, emergency or emergency contact arrangements are in place.

11.5. Fatigue

384. A fatigue risk assessment should be carried out and written fatigue risk control measures drawn up for all operations and in accordance with national laws and regulations. The fatigue risk assessment should consider work-related fatigue, resulting from features of the work and the workplace. The fatigue risk control measures should specify working-time arrangements where workers:
   (a) carry out work between 7 p.m. and 6 a.m.;
   (b) work more than 48 hours in any consecutive five-day period (working on each day) including unplanned work, emergencies, overtime, breakdowns and call-outs;
(c) are required to engage in substantial commute;
(d) are employed on rotating or irregular shift patterns; or
(e) do not have a minimum of at least 24 consecutive hours off in any seven-day period.

385. The fatigue risk assessment and risk control measures should be developed in consultation with workers and their representatives and there should be a demonstrated commitment from all parties that it will be supported by the whole organization. It should cover the workloads, rosters, roles and responsibilities of managers, professional staff, contractors, subcontractors, those who work on planned rosters and unplanned work such as overtime and call-outs. Commuting times as well as suitability of employer-provided accommodation should also be considered.

11.6. Alcohol and drug use

386. The workplace should be drug- and alcohol-free in accordance with national law and practice.

387. Employers and workers and their representatives should jointly assess the effects of alcohol and drug use in the workplace and should cooperate in developing and implementing a written alcohol and drug policy and programme for the forestry operation.

388. Alcohol and other drug policies and programmes should promote the prevention, reduction and management of alcohol and drug-related issues in the workplace. They should apply to all staff and the same restrictions or prohibitions with respect to alcohol should apply to both management and workers.

389. Information, education and training programmes concerning alcohol and drugs should be undertaken to promote safety and health in the workplace and should be integrated into broad-based health programmes when appropriate.

390. Testing of bodily samples for alcohol and drugs in the context of employment involves moral, ethical and legal issues of fundamental importance, requiring a determination of when it is fair and appropriate to conduct such testing.

391. Workers who seek treatment and rehabilitation for alcohol- or drug-related issues should not be disciplined or discriminated against by the employer and should enjoy fundamental principles and rights at work in accordance with the ILO Declaration on Fundamental Principles and Rights at Work (1998), as amended in 2022. Any information communicated should be treated with confidentiality.

392. It should be recognized that the employer has authority to discipline workers for employment-related misconduct associated with alcohol and drugs. Recognizing that each case is unique and different, however, counselling, treatment and rehabilitation should be preferred.

393. Further information can be found in the ILO code of practice on management of alcohol- and drug-related issues in the workplace (1996); Alcohol and Drug Problems at Work: The Shift to Prevention (ILO, 2003), and the SOLVE Training Package: Integrating Health Promotion into Workplace OSH Policies (ILO, 2012).

11.7. Violence and harassment

394. In accordance with the provisions of the Violence and Harassment Convention (No. 190) and Recommendation (No. 206), 2019, an inclusive, integrated and gender-responsive approach to the prevention and elimination of violence and harassment in the world of work, including gender-based violence and harassment should include the forestry sector, and should be adopted by the competent authority. Such an approach should promote practices and measures that help to
prevent and eliminate violence and harassment and take into account violence and harassment involving third parties. Cooperation between competent authorities, employers and workers and their representatives is essential in developing and implementing appropriate policies and procedures to minimize the risk of violence and harassment.

395. The competent authorities should adopt laws, regulations and policies to:

(a) ensure the right to equality and non-discrimination in employment and occupation, including for women workers, as well as for workers and other persons belonging to one or more vulnerable groups or groups in situations of vulnerability that are disproportionately affected by violence and harassment in the world of work;

(b) monitor and enforce laws and regulations regarding violence and harassment in the world of work;

(c) ensure easy access to appropriate and effective remedies and safe, fair and effective reporting and dispute resolution mechanisms and procedures in cases of violence and harassment in the world of work, such as protection against victimization of or retaliation against complainants, victims, witnesses and whistle-blowers and legal, social, medical and administrative support measures for complainants and victims;

(d) ensure that workers have the right to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to life, health or safety due to violence and harassment, without suffering retaliation or other undue consequences, and the duty to inform management;

(e) recognize the effects of domestic violence and, so far as is reasonably practicable, mitigate its impact in the world of work; and

(f) ensure that labour inspectorates and other relevant authorities, as appropriate, are empowered to deal with violence and harassment in the world of work, including by issuing orders requiring measures with immediate executory force, and orders to stop work in cases of an imminent danger to life, health or safety, subject to any right of appeal to a judicial or administrative authority which may be provided by law.

396. The competent authority should adopt laws, regulations and policies and employers should develop policies to hold perpetrators of violence and harassment in the world of work accountable and provide counselling or other measures, where appropriate, with a view to preventing the reoccurrence of violence and harassment, and facilitating their reintegration into work, where appropriate.

397. Employers should inform themselves about applicable international instruments, national laws and regulations and the recommendations of the competent authority, and take appropriate steps commensurate with their degree of control, so far as is reasonably practicable to take into account violence and harassment and associated psychosocial risks in the management of OSH. They should formulate and implement, in consultation with workers and their representatives, a workplace policy on violence and harassment. Such a policy should:

(a) state that violence and harassment will not be tolerated;

(b) establish violence and harassment prevention programmes with, if appropriate, measurable objectives;

(c) specify the rights and responsibilities of the workers and the employer;

(d) contain information on and have a mechanism for complaint and investigation procedures;
(e) provide that all internal and external communications related to acts of violence and harassment will be duly considered, and acted upon as appropriate;

(f) specify the right to privacy of individuals and confidentiality while balancing the right of workers to be made aware of all hazards; and

(g) include measures to protect complainants, victims, witnesses and whistle-blowers against victimization or retaliation.

398. The employer should take appropriate steps commensurate with their degree of control, so far as is reasonably practicable to identify hazards and assess the risks of violence and harassment with the participation of workers and their representatives and take measures to prevent and control them. The risk assessment should take into account factors that increase the likelihood of violence and harassment, including psychosocial hazards and risks. Particular attention should be paid to the hazards and risks that arise from working conditions and arrangements, work organization and human resource management as appropriate, as well as from discrimination, the abuse of power relations and the gender, cultural and social norms that support violence and harassment.

399. Employers should take appropriate steps commensurate with their degree of control so far as reasonably practicable and provide to workers and other persons concerned information and training, in accessible formats as appropriate, on the identified hazards and risks of violence and harassment and the associated prevention and protection measures, including on the rights and responsibilities of workers and other persons concerned in relation to the workplace policy referred to in paragraph 397.
Part II. Technical guidelines for safety and health at the forestry worksite
12. General provisions

400. A wide variety of working methods are used in forestry operations, and the work consists of a multitude of different tasks. This code cannot therefore provide an exhaustive description of safety requirements for every possible system or method used, either in terms of selection or detail. The methods covered in this part of the code have thus been selected to reflect-methods and techniques in common use worldwide, and the activities involving the highest risks for the safety and health of forestry workers. This code promotes good practice guidelines and standardization in forestry work roles, especially those critical for safety and health.

401. Where alternative systems of work to those mentioned in the code are used and authorized by a competent authority, they should meet or exceed the safety and health provisions in this code.

402. In line with the ILO Guidelines for a just transition towards environmentally sustainable economies and societies for all, the competent authority in consultation with social partners should improve, adapt or develop and create awareness of OSH standards for technologies, work processes and new materials related to the transition.

403. It is the responsibility of the employer to ensure, so far as is reasonably practicable, that the forestry operations and work methods under their control are safe and without risk to health. In performing their work, workers should comply and cooperate with their fellow workers and their employers in the discharge by the employer of their occupational safety and health responsibilities related to working methods used in forestry operations.

404. The competent authority should formulate and implement national laws and regulations to ensure the safety and health of workers in forestry operations.

405. The technical part of these guidelines should be read and implemented with the provisions outlined in Part I, in particular in relation to the tasks, duties and responsibilities of the different workplace parties. When in this section it refers to workers operating machinery and/or executing operations, it is understood that they should only do it if they have received adequate information, instruction and training.

12.1. Planning of forestry work

406. All forestry activities should be thoroughly planned and organized in advance to ensure a safe and healthy working environment to all those engaged in forestry operations.

407. The planning and organization of operations should be based on a forest management plan which should indicate, as appropriate:
   (a) what type of work is necessary;
   (b) the objectives of the operation;
   (c) the location of designated worksites;
   (d) the time schedule for specific operations;
   (e) specifications for products or other outputs;
   (f) specifications for working methods to be used;
   (g) the person responsible for carrying out and supervising the operations;
   (h) a contingency plan in the event of for example inclement weather or problems with equipment.
408. The environmental factors that may have an impact on safety and health should be identified and evaluated as part of the planning process.

409. Prior to the commencement of forestry operations at a worksite the employer should conduct a risk assessment to identify hazards and assess risks, where appropriate, to safety and health, in line with the provisions of Chapter 3.5 of this code. Both natural and man-made hazards should be noted. The risk assessment should consider in particular:

(a) the topography of the land and the ground surface condition;
(b) working methods and equipment to be used;
(c) dangerous trees, such as unstable, toxic, dead or rotten standing trees and other worksite hazards;
(d) overhead electric or telephone lines;
(e) roads, hiking or skiing tracks or other infrastructure.

410. Identified hazards should be marked on a map of the area and on the worksite, with for example a ribbon or barrier, whenever practicable.

411. For each task the most appropriate and safest system of work available should be chosen. Use should be made of the systems of work, best practice guidelines and standardized methods which have been approved and recommended by competent authorities.

412. As far as practicable, manual and motor-manual work should be supported by machines, particularly to minimize risks generated by lifting and carrying of heavy loads and those risks arising from the handling of power-driven hand-held machines.

413. Infrastructure requirements should be assessed prior to work, taking into account the present location, the ability of roads and trails to support traffic movement, and the need for additional installations. Any new infrastructure should be planned according to the transport facilities used for personnel, material and produce.

414. Evacuation routes and procedures in case of emergency should be planned thoroughly.

415. The location of shelter facilities and storage for tools, equipment and material should be determined and prepared well in advance, in order to reduce the workload and to increase productivity by avoiding carrying of loads over long distances.

416. Appropriate and safe means for transport of personnel, tools, equipment and material to and from the worksite should be provided by the employer and maintained in good condition.

417. The direction of work progress and transport boundaries should be identified and marked in the field before work is started. Sufficiently detailed maps of the work area are important tools for adequate planning of forest operations.

12.2. Work organization

418. The tasks, duties and responsibilities of all workers and other persons, where relevant, in the vicinity of the worksite should be clearly defined, in line with Chapter 2 of this code.

419. The employer should provide clear instructions to workers, in writing where appropriate, but at least verbally. These should include information on:

(a) job specification;
(b) location of the worksite;
(c) required tools and machines;
(d) identified risks and relevant safety rules;
(e) required personal protective equipment;
(f) rescue procedures in the event of an accident requiring evacuation;
(g) need for liaison with other workers, including any contractors;
(h) the presence and location of other workers on the worksite and organization of the work to ensure safe operating distances are respected;
(i) emergency plans for the worksite; and
(j) site hazards outlined in paragraph 409 along with planned control measures.

420. Work methods, tools and equipment should be safe and comply with ergonomic principles. If alternative work methods are available, the method presenting the lowest level of risk should be chosen.

421. Employers should, so far as is reasonably practical, train workers in different tasks and put in place organizational measures to promote job rotation to reduce prolonged unfavourable working positions and workloads inherent in certain jobs.

422. No person should be required to work in a location which is so isolated that assistance in case of an emergency cannot be summoned. Where forestry workers are working in isolated situations, they should be linked to their base or their superiors by a reliable means of communication, and, if applicable, be equipped with lone worker monitoring systems. Regular contact should be made during the workday, including contact at the end of the day. Where scheduled contact is not made, search and rescue operations should be undertaken immediately.

423. In any operation where cutting, extraction or loading is carried out, there should be a team of at least two workers who should be in visible or audible contact with one another. Exceptions to this requirement may be made for workers provided with two-way radios, mobile telephones or other effective means of communication.

424. Employers should conduct a briefing with workers before commencing work, informing them of the findings of the risk assessment and providing directives on how to deal with the hazards/risks identified.

425. Supervision of work should be entrusted to a trained and competent person in accordance with the provisions of Chapter 2.

426. When unexpected hazards are encountered or a task cannot be performed in accordance with safe methods, such as described in this code, work should be stopped and the supervisor consulted on how to proceed.

427. Where several crews, contractors or self-employed persons work on the same site, the employer needs to make arrangements to ensure coordination and to assign and communicate responsibility for supervision.

428. Any worksite which poses a threat to the safety of visitors, including the general public, should prohibit unauthorized entry by signs, which may show for example “danger, tree felling” or “no entry, timber operations”. Forestry operations should be stopped immediately if an unauthorized person is spotted in the working area.
429. When the employer has permitted the entry of visitors to the worksite, all visitors should be adequately supervised, and adequate visitor safety and health induction training should be provided. If the risk assessment requires it, visitors should be provided with appropriate PPE.

430. When dangerous operations are carried out along public roads, the road should be closed for a safe distance while work is in progress. The length of the road closure should be agreed upon beforehand with the competent authority.

13. Silviculture

13.1. General provisions

431. Workers engaged in activities described in this chapter should be provided with and use personal protective equipment according to national laws, regulations and recommendations, as well as to the provisions in Chapter 8.

432. All tools and machines used for silvicultural activities should be designed, equipped, operated and maintained according to the provisions in Chapter 7 and/or manufacturers’ recommendations.

13.2. Site preparation

433. Where site preparation activities include the felling and conversion of trees, the provisions in Chapter 14 apply accordingly.

13.2.1. Manual clearing

Organization

434. Generally, manual clearing methods should only be used where the worker only has a small area to clear or where it is not practical or safe to use machines. A risk assessment should be completed to ascertain whether mechanical clearing equipment can be used safely.

435. Hazards arising from dead trees, slash or other debris should be assessed prior to silvicultural operations. If necessary to avoid risks, dead trees should be made safe after an assessment by a competent person. If for any reason dangerous trees must be retained, their location should be made known to all workers operating in the vicinity. A risk zone of twice the length of the tree should be marked clearly and unmistakably and no persons should enter this zone.

436. If slash is going to be left on the site in heaps or piles, its position should be planned to avoid hindrance to further activities, or for it to become a fire hazard.

437. Burning of slash should only be undertaken when safe and appropriate, and in accordance with national laws and practices, and the appropriate time of the year should be chosen. Burning should only be undertaken when it can be controlled. Very dry or windy conditions should be avoided. The provisions for firefighting and fire management in Chapter 15 apply accordingly.

Equipment

438. Workload and work progress in manual clearing activities depend largely on the type of vegetation to be removed and density of vegetation and debris. Workload should be minimized by choosing appropriate and safe tools for the specific type of vegetation, such as:

(a) for herbaceous vegetation, scythes, sickles or brush saws; and
(b) for removal of small woody growth, shears or brush saws should be considered as alternatives to brush hooks or machetes.

439. If site conditions vary significantly, workers should be supplied with a choice of different tools to allow the use of those most appropriate.

440. When the uprooting of stumps is necessary, all roots should be cut or broken to prevent them from falling back and causing injury. Pulling stumps out manually should be avoided as far as practicable; it is safer to use machine-mounted winches or other mechanized means like grinding, drilling or excavators. When manual uprooting of stumps is unavoidable, poles or stakes of sufficient strength should be used as levers, to reduce physical effort.

Operation

441. Cutting tools and spades with unprotected blades should not be carried over the shoulder.

442. When using cutting tools, workers should keep a safe distance from other persons (at least two tree heights or 3 metres is recommended whichever is greater, or 15 metres for non-tree operations).

443. Workers should maintain a safe and balanced stance with a secure handle grip. The direction of the cutting must be away from the feet and legs.

13.2.2. Motor-manual site preparation

Equipment

444. For safety and ergonomic reasons, chainsaws should only be used where stem diameters exceed 100 mm. Where chainsaws are used, the provisions in Chapter 14 apply accordingly.

445. Clearing saws/brushcutters should be equipped with:
   (a) clearly marked on/off switch;
   (b) throttle trigger lockout to prevent accidental operation of the throttle control;
   (c) vibration damping;
   (d) an adjustable suspension ring for harness;
   (e) quick release system to release the operator from the harness/machine;
   (f) blades suitable for specific types of vegetation; and
   (g) a blade guard and blade cover.

446. For supporting the clearing saw/brushcutter, workers should use a harness, fitted and adjusted correctly and in accordance with the manufacturer’s recommendations.

447. Workers should be provided with a spare blade and an adequate tool kit for corrective and preventive maintenance.

Operation

448. Before starting work, clearing saw/brushcutter operators should check that:
   (a) all safety features are functioning correctly;
   (b) the blade guard is undamaged and securely fixed in the correct position;
the blade is seated correctly, is sharp and not cracked, and that the blade retaining nut is secure;
(d) the balance of the saw is correct for the operating conditions;
(e) the handles give a comfortable working stance, the weight is spread evenly over both shoulders using the purpose designed harness and the blade hangs straight in front of the worker's body; and
(f) the blade is stationary when the engine is idling.

449. Clearing saw blades should always be kept sharp using file types as specified by the manufacturer. Blades with cracks or missing teeth must be changed immediately and discarded.

450. When operating a clearing saw, a safety distance of 15 m or twice the height of the stems to be cut, whichever is the greater, must be maintained between the operator and other persons.

451. A clearing saw should always be used at full throttle for safe and smooth cutting.

452. A clearing saw should be operated so that debris ejected by the saw is propelled into a safe zone.

453. The blade must not be touched when the engine is running.

454. When cutting woody material or where obstructions create a risk of kickback, the 8–11 o'clock sector of the blade only should be used.

455. For fuelling, the provisions for chainsaws and brushcutters in Chapter 14 apply.

456. Prolonged maintenance of machinery should be carried out in places protected from the weather, with measures to avoid environmental contamination by chemical agents.

13.2.3. Mechanized site preparation

Operation

457. When using a tractor or winch for pulling trees or stumps, any person in the vicinity should position themselves safely, for example behind the load or behind standing trees during the operation.

458. The tractor should be securely braked, fitted with screens to protect the operator in their normal working position should the cable break and positioned at a safe distance from the tree or stump to be pulled. Pulling should be done with the winch and not by moving the tractor. Particular care should be taken on slopes in order to avoid the tractor overturning.

459. When wood chippers or mechanically operated rakes are used, a safety zone should be established to prevent injuries from flying debris or other moving material.

460. Wood chippers and their chutes should be at a suitable height and should have an emergency stopping device and the necessary guards in place to protect workers from rotating parts and flying debris.

461. Excessive debris should be piled in heaps or rows to facilitate access.

13.3. Tree nursery

Organization

462. A tree nursery should be located in an area of level or terraced ground, easily accessible by vehicles, sheltered from wind and with access to reliable water supply.
463. Ground should be cleared from any debris, and the surface should be covered by materials that prevent slips and falls.

464. Watering and draining pipes or channels should not block the walkways.

465. The seed sowing and transplanting beds should be constructed with solid materials at a height that maintains optimal ergonomic working postures for manual handling to reduce risks of musculoskeletal injuries. Stools should be provided for manual handling of seedlings stored at ground level to avoid exposures to bending and squatting.

466. Seedling trays from solid light materials should be used.

467. Wheeled trolleys or carts should be used for transporting seedlings, plants, tools or materials within the nursery area.

468. Locations for plant storage and distribution should be pre-planned and evenly spread over the nursery area, in order to keep transport distances as short as possible.

469. Chemical substances such as fertilizers and pesticides should be stored in the farthest location from the sowing and seedling beds, and clearly marked.

470. Workers should be informed when plants have been chemically treated and about the re-entry period. In handling treated plants, workers should be instructed about the health risks arising from the chemicals used. Information and training should be provided on safe handling procedures and the requirements for PPE.

471. Lighting should be appropriate to the visual demands of the task.

472. Workers working at height or in confined spaces should be trained and competent to work in these areas.

**Equipment**

473. Blades of shovels and hand trowels should be in good repair and maintained.

474. The size of handheld portable water or liquid fertilizer cans/pots/sprayer used should not exceed 5 litres or in accordance with national laws and practice.

475. Suitable PPE based on a risk assessment should be provided for work in direct contact with plants or soils.

**Operation**

476. Workers should maintain a balanced ergonomic stance whether in standing or sitting positions.

477. Treated plants should be handled carefully to minimize personal contamination.

478. Any contamination of the skin or protective clothing by a pesticide concentrate should be washed off immediately and thoroughly.

479. Workers working with pesticides and chemicals and who are feeling unwell should immediately report symptoms to the supervisor and seek medical advice as soon as possible, giving details of the work undertaken and the full name of the pesticide product used.
13.4. Planting

Organization

480. Workers should not be required to engage in manual handling or transport of a load which by reason of its weight or nature is likely to jeopardize their safety or health.

481. Locations for plant storage and distribution should be pre-planned and as evenly spread over the planting area as possible, in order to keep transport distances as short as possible.

482. Workers should be trained to maintain optimal ergonomic working postures to reduce the risk of musculoskeletal injuries/diseases, such as using the body weight to insert planting tools, to avoid back twisting and using the planting tool as a support when bending.

483. Where feasible, task rotation should be promoted to avoid short-cycle repetitive planting work.

484. When planting on sloping terrain, the direction of planting should be uphill or cross slope, to avoid excessive bending of the back and to avoid material falling on the workers.

485. Workers should avoid working directly beneath or above other workers on steep terrain where there is a danger from rolling objects.

486. Workers should be informed when plants have been chemically treated. If such treated plants were to be planted, workers should be instructed about the health risks arising from the chemicals used. Information and training should be provided on safe handling procedures and the requirements for PPE.

487. On large planting sites where workers are scattered, an audible assembly signal should be agreed upon in case of emergencies.

13.4.1. Planting of untreated plants

Equipment

488. Employers should minimize the risks of musculoskeletal disorders from planting by undertaking a risk assessment taking into account the equipment used, patterns of work and terrain.

489. When carrying trays of containerized plants, polypots or bundles of bare-rooted plants, suitable backpacks or harnesses with good weight distribution should be used, to reduce fatigue and the risk of injuries due to stumbling and falling when carrying heavy loads.

490. Manual transport of plants or seedlings over longer distances should be avoided as far as practicable, to safeguard the health of workers. If available, animals, vehicles, and particularly small off-road vehicles should be used.

491. When selecting planting tools, the size of the plants, the ground and soil conditions, and the body size of the workers should be taken into consideration.

492. Handles of planting tools should be designed to minimize the transmission of shock to the hand if the blade hits a hidden rock or root. They should be of contrasting colour for easy retrieval in the field.

493. Heads of the planting tool should be secure and the handle free from splinters and cracks.

494. Blades of planting tools should be kept sharp. For sharpening the blade, suitable files with handles should be available at the worksite.
495. The use of water-filled pails for carrying plants should be avoided. If bare-rooted plants have to be protected from drying out, wet peat moss or similar material should be used.

**Operation**

496. Workers should maintain a balanced stance, keep the planting tool blade clear of their feet and legs and maintain a safe distance from other persons.

497. Workers should try to avoid striking any hard obstructions.

498. Tools should be carried in a safe manner, i.e. with the blade well away from the body, spade edge facing down, and below shoulder height.

**13.4.2. Handling and planting of chemically treated plants**

499. Where chemicals including fertilizers are used, the systems of work for the safe handling of hazardous chemicals and treated material prescribed by the manufacturer or supplier should be followed strictly, including a waiting period.

500. Only chemicals which have been approved by the competent authority for the intended purpose should be used.

501. Treated plants and other contaminated material should be kept separate from rest and eating areas, stored personal clothing and other personal belongings.

502. Plants and containers should be clearly labelled with the full name of the chemical and its active ingredient, essential precautions, symptoms of intoxication and measures to be taken should intoxication occur. Workers should receive information on the classification and labelling of chemicals and on chemical safety data sheets in forms and languages which they easily understand.

**Operation**

503. Adequate facilities should be provided on site for washing, changing and storage of clothing, PPE and tools, separately from personal washing.

504. Treated plants should be handled carefully to minimize personal contamination. They should be packed and transported on the worksite to allow for easy access to the plants, thus making it possible to avoid handling the plants more than necessary.

505. Planting bags or harnesses or other containers for transport of treated plants at the worksite should be cleaned by emptying and washing out daily. They should be manufactured using chemical-resistant material or lining.

506. Any contamination of the skin or protective clothing by a pesticide concentrate should be washed off immediately and thoroughly.

507. Workers feeling unwell should immediately report symptoms to the supervisor and seek medical advice as soon as possible, giving details of the work undertaken and the full name of the pesticide product used.

508. At the end of each work period workers should:

(a) thoroughly clean the outsides of gloves and protective clothing, preferably with running water;

(b) wash hands in soap and fresh water, not previously used to clean contaminated tools and protective equipment.
Clothing or protective equipment which may be contaminated by chemicals hazardous to health should not be laundered, cleaned or kept at workers’ homes.

Planting-tool handles should be washed daily.

Care should be taken to ensure that wastewater from washing does not contaminate watercourses.

13.4.3. Planting by hand-held power post-hole borer (rock drill)

The correct augers for the type of operation and ground should be selected.

Hand-held post-hole borers should be operated and maintained according to the manufacturer’s instructions, and they should be equipped with an operating control that shuts the machine off when not in use.

Operators should ensure by frequent inspection that the machine is in a safe working condition.

The auger must remain stationary when the engine is idling.

Machines should be lifted using the leg and arm muscles and keeping the back straight.

The appropriate auger speed and drilling pressure for the conditions encountered should be maintained and the bit should not be forced.

When clearing the auger of any unwanted material, the engine must be switched off.

Operators should adopt a safe, well-balanced stance at the site to be drilled, keeping their feet well clear of moving parts.

When fuelling the machine, the prescriptions for chainsaws (Chapter 14) apply equally.

13.5. Tending

The work area should be divided in manageable sections to allow workers to keep a safe distance from others, as well as to have an overall view of their work progress and maintain an efficient work speed. Special care is required when work is carried out on slopes. If the gradient is steep, workers should not work directly above or below others. Operations should be planned to prevent workers being exposed to rolling or sliding material.

Tools appropriate to the diameter and the species of the trees being cut should be used.

When using hand tools, chainsaws or clearing saws for tending, the prescriptions in Chapter 14 apply.

Tools for the application of chemicals for killing standing trees should be designed to prevent workers coming into contact with these substances.

13.6. Pruning

Organization

Trees designated for pruning should be marked clearly, as appropriate.

High pruning from the ground using a saw with a long handle causes a high static load for the shoulders and arms, as well as an unfavourable neck position. This method should be avoided, particularly for pruning trees with large branch diameters. In such circumstances, equipment suited to working at heights should be used, for example suitable mobile elevating work platforms, when possible.
527. If working at a height where a fall is likely to result in personal injury, workers should use a safe system of work to protect against a fall.

**Equipment**

528. Tools capable of reaching the pruning height required should be chosen.

529. It should be recognized that different tree species require a different saw-tooth configuration to minimize the workload and achieve high productivity.

530. Cutting edges should be maintained in sharp and clean condition.

531. The following equipment should be readily available at the worksite:
   (a) spare blades, a spare handle and securing devices, for example screws, bolts or rivets;
   (b) suitable files for sharpening the blade;
   (c) tools for blade replacement;
   (d) a solvent, with appropriate gloves for the worker, to clean cutting blades; and
   (e) blade protection for transport.

532. Ladders should generally only be used for access and not for work at height. In limited circumstances where a worker performs pruning work from a ladder:
   (a) the ladder should be secured to provide stability;
   (b) chainsaws should not be used; and
   (c) the worker should be provided with adequate fall protection and PPE.

533. Ladders should be of light material and allow a safe stance. The steps should be of equal distance. The ladder should be equipped so that it can be securely attached to the tree, at the top of the ladder. The ladder should be positioned at an angle of approximately 75 degrees or 1:4 ratio. Ladders should be checked prior to use for defects; if defects are found the ladder should be removed from use.

**Operation**

534. Workers should:
   (a) maintain a safe working distance from other persons;
   (b) make sure that there is enough clear space so that the sawing action is unimpeded;
   (c) stand well clear of falling branches and other debris;
   (d) carry tools safely and cover blades when in transit; and
   (e) be provided with and use suitable means of communication.

13.7. **Tree climbing**

**Organization**

535. A risk assessment should be carried out before climbing or performing any work in trees. The appropriate equipment and number of operators should be decided upon, and emergency and rescue procedures known and agreed by all staff.
536. Tree climbing operations should be carried out by a team of at least two people. One of the ground staff should be competent in rescue techniques or able to affect an aerial rescue procedure.

537. Ground staff should maintain effective communication with the climber.

538. At no time should tree climbing operations be done when visibility is seriously impaired or during inclement weather, such as storms or heavy rain, or when the tree is covered with ice.

539. Dead or weak trees should not be climbed.

540. To prevent the risk of a fall when climbing trees, risks should be minimized by providing a safe system of work. A safe system of work for accessing trees at height includes:

(a) providing a temporary work platform, such as an elevating work platform;

(b) if using a temporary work platform is not possible, providing a work positioning system; or

(c) if neither of these are possible, providing a fall arrest system.

541. Providing a temporary work platform or work positioning system alone may not be enough to minimize the risk of a fall. In most circumstances it may be appropriate to provide additional controls. For example, a backup system could be provided to arrest a fall should other controls fail to safely support a worker. This is standard practice when using an elevating work platform, but should also be considered when using any temporary work platform or work positioning system.

542. Trees should only be climbed by experienced and fully competent persons in good physical condition.

543. Climbers should be fully trained in safe climbing techniques and tasks performed when climbing trees, such as rigging, pruning, tree topping or seed collection.

544. Climbing teams (including ground staff) should be trained in basic first aid techniques and carry a personal first aid kit.

**Equipment**

545. All climbing equipment should:

(a) be maintained in accordance with national legislation and in compliance with the manufacturer's recommendations;

(b) be used only for the designed purpose;

(c) not be altered or modified in any manner that undermines the structural integrity of that piece of equipment;

(d) be replaced if there are signs of excessive wear or damage or are inoperative; and

(e) be kept away from unprotected cutting tools, fuel, chemicals and any other potential cause of damage while on site and during storage and transit.

546. Climbers should be equipped with personal protective equipment with a sufficient breaking strength, such as:

(a) work positioning system, using a safety belt or sit harness with double “D” rings;

(b) karabiners;

(c) a climbing rope and strops; and
(d) steel spurs long and sharp enough to hold in any tree in which they are used.

547. Climbers and ground staff should wear:
   (a) safety helmets; climbing helmets when climbing;
   (b) boots or shoes with good grip and safety toecaps; and
   (c) other PPE as appropriate.

548. Safety harnesses should be suitable for the operation. Where cutting tools are used by the climber, safety belts with wire ropes, ropes with a steel core or a high-quality safety chain of sufficient strength should be used. Climbers should take proper care of safety belts and inspect them daily during use.

549. Fastening, adjustment and unfastening of safety ropes should be simple and quick.

550. An extra set of climbing equipment should be available at the worksite, so as to be able to assist or rescue a climber in the case of an emergency, for example injury or vertigo.

551. In the tree, where possible, the system should be securely attached to two load-bearing anchor points. Each anchor point should be strong enough to support the climber, work equipment and any foreseeable loading.

552. Work positioning systems should only be used if there is a suitable backup system for preventing or arresting a fall. If the backup system includes a second line, the user should be connected to it.

553. Where the climbing rope cannot be kept taut enough to prevent a significant vertical fall, a suitable fall arrest system should be worn comprising a full body harness and an energy absorbing strop.

554. The fall-arrest system should be selected in accordance with the worker's height and weight and consist of:
   (a) an approved body harness;
   b) a shock-absorbing lanyard, where the potential to fall is greater than 2 m taking into consideration the swing fall hazard;
   (c) double or triple-action snap hooks (or karabiner type rings); and
   (d) secure anchorage points or static lines.

555. There should be a process for ensuring that arrest equipment, including harnesses, shock-absorbing lanyards, hooks or rings are tested and certified for use; inspected by the user before use; and destroyed after a fall (except for self-retracting equipment) or where inspection shows evidence of excessive wear or mechanical malfunction.

556. Appropriate and timely rescue should be provided when using fall-arrest equipment to prevent suspension trauma.

557. Ladders used for access into a tree should incorporate a non-slip or stabilizing base and should be supported by ground staff until a rope is attached from the tree to the ladder.

558. When topping or debranching standing trees, the lightest chainsaw possible should be used.

Operation

559. When working in the tree, climbers should be secured by means of a safety rope or strop at all times.
560. Ground staff should:
   (a) ensure that all equipment is serviceable before being passed up to climbers;
   (b) maintain concentration, watch the climbers and anticipate their needs, passing up tools or other equipment;
   (c) keep climbing and work ropes on the ground in a safe position away from obstructions, vehicles, other equipment, and free of knots, kinks, tangles, debris and branch wood;
   (d) ensure that all reasonable precautions are taken to exclude all public and traffic from the work area while work is in progress.

561. Trees should not be topped unless a ground worker is in sight of the climber and has signalled it is safe to do so.

562. When erecting a ladder for access into a tree, the top of the ladder should be set firmly, to minimize the risk of the ladder twisting and as soon as practicable secured to the tree. The ladder should be positioned at an angle of approximately 75 degrees or 1:4 ratio.

563. When using a ladder for ascent into a tree, the climbers should be secured to the tree before moving off the top of the ladder or carrying out any other work.

564. When the climber is using a passline on a spar tree in cable systems, an assistant should stand by the passline drum to make sure that the line is evenly spooled onto the drum.

565. When using climbing irons, climbers should be secured to the tree with either:
   (a) a climbing rope; or
   (b) a wire or wire-reinforced strop when using a chainsaw.

566. Climbers working with climbing irons should:
   (a) when ascending, be secured and remain tied to the tree when passing obstructions such as branches; the means of attachment to the tree should be adjustable to allow for the taper of the trunk and for passing the rope over small obstructions such as branch stubs;
   (b) when using a chainsaw, check the positioning of the strop all around the circumference of the tree in relation to the position of the cut.

567. Using a rope and harness, climbers should:
   (a) when ascending, be securely attached to a suitable anchor point at all times by means of the climbing rope, or strop;
   (b) when using anchor points, transfer their weight to the new anchor point before releasing the previous one;
   (c) when ascending to a suitable anchor point, maintain secure attachment before moving to the point of work;
   (d) be securely anchored to the tree by the climbing rope, which should be kept as taut as possible, when moving in the tree;
   (e) be secured by a supplementary anchor point, when working out on a limb where a fall or swing can be foreseen.

568. Equipment should be passed to the climber only by use of the climbing rope or a separate tool line.

569. Chainsaws should:
(a) be checked, started and warmed up by ground staff before being passed up to the climber, with the chain brake applied;
(b) for general use, be attached to the climbing harness with a strop; where there is a risk that the chainsaw might be trapped or taken with a severed section, the chainsaw should not be attached to the climber; and
(c) be switched off or the chain brake applied after each cutting operation.

570. Tools used by the climber, except the chainsaw, should be safely secured to the belt when not in use.

571. Climbers and ground staff should ensure that risk of contact with either people or property from falling debris or equipment is minimized.

572. While the climber is working in a tree, other persons should keep a sufficient distance from the tree to be clear of falling objects.

573. Climbers should give warning when any equipment or material is in danger of dropping, or is to be dropped deliberately.

574. Climbers should descend to the ground slowly in a controlled manner.

575. During descent, climbers should ensure that the climbing rope is of sufficient length, remains undamaged and that the end is knotted to prevent its involuntary release from the climbing knot or descendeur.

14. Harvesting

14.1. General provisions

576. Harvesting operations should be planned in advance to promote safety and efficiency and ensure proper guidance and control.

577. Operational planning and organization should incorporate contingencies to cope with unexpected difficulties.

578. Before starting the felling work, precipices, soft cliffs, crossings of waterways, power lines, passageways and other danger and harm factors that essentially affect the safety and health of workers should be determined on a site-by-site basis.

579. Workers engaged in activities described in this chapter should be provided with and use personal protective equipment according to national laws, regulations and recommendations, as well as to the provisions in Chapter 8.

580. All tools and machines used for harvesting operations should be designed, equipped, operated and maintained according to the provisions in Chapter 7 and/or manufacturers' recommendations.

581. There should always be equipment available on site or within easy reach to be able to safely take down hung-up trees.

582. An appropriate transportation plan should be drawn up including where relevant:
   (a) the volume of timber to be harvested;
   (b) the specifications of produce and volume per assortment;
(c) the means of transport to be used for extraction, for example, skidder, forwarder, cable crane; and
(d) the direction of extraction routes and location of landings and roadside stacking areas.

583. All extraction routes and associated catchment areas should be clearly marked both on maps and in the forest. In operations where planning involves decisions about individual trees, the approximate direction of fall for each tree to be felled should be determined and marked on the tree using the extraction plan as a guide, with all safety aspects duly considered.

584. Dead or rotten standing trees entail an especially high risk of falling debris, and they often fall unexpectedly in any direction. They should be felled by competent workers, preferably in advance of the felling operation, using machines or other methods assessed as safe.

585. No felling, crosscutting or debranching should be undertaken in any work area unless a risk assessment has been conducted taking into account the risks generated by leaning dead trees, dead trees which have been brushed by a felled tree, or live trees posing a safety risk, and ensuring appropriate risk control measures are in place.

586. During all operations the worksite should be kept as clear as possible. It should have sufficient space to allow machine operators to be able to retreat safely and efficiently in case of an emergency.

587. The work should be planned to minimize manual handling of timber. Accurate directional felling relative to the terrain, timber stand and lean needs to be considered.

588. As far as practicable, manual and motor-manual (chainsaw) felling operations should be assisted by machines, particularly to minimize the lifting and carrying of heavy loads and to reduce risks arising from hung-up trees.

14.2. Felling and conversion

14.2.1. Manual and chainsaw felling

Organization

589. Manual chainsaw felling should only be undertaken by workers that have been assessed, qualified and able to demonstrate the competency skills needed to fell timber in a safe manner.

590. When planning the felling direction, the method and the route of extraction are important factors, as safety and productivity are highly dependent on how logs are positioned relative to the direction of extraction.

591. Felling areas should be divided into zones which should be clearly allocated to workers engaged in the operation, so that no two workers are closer than twice the length of the tallest tree to be felled. The felling zones should preferably be marked in the stand, for example by painting arrows on edge trees.

592. No persons should approach closer to the feller than twice the length of the tree being felled, unless the feller has acknowledged that it is safe to do so. In any event, no persons other than the feller should be at the base of the tree being felled, unless they are:

(a) assisting the feller;
(b) supervising;
(c) training others or being trained; or
(d) duly authorized to do so by a competent person.

593. Any person within two tree lengths of a tree being felled should be under the direct control of the feller (except when a feller is under the direct control of a trainer).

594. Overhead electric lines can pose significant risks in felling. The competent authority should develop specific regulations, including stand-off distances, to prevent approach by any person or object to electric lines. A safe distance of at least twice the height of the tree to be felled, or the distance otherwise specified by the competent authority, should be used. In cases where this is not possible, the relevant electricity supply authority should be contacted for information on specific requirements, and, for example, possible de-energizing of the lines.

595. Special care is required when work is carried out on slopes. If the gradient is steep, workers should not work directly above or below others. Operations should be planned to prevent workers being exposed to rolling or sliding material.

**Equipment**

596. Depending on the diameter of the tree being felled, workers should be supplied with:

(a) a handsaw of appropriate size and design; or

(b) a chainsaw which is sufficiently powered, and equipped with a guide bar of sufficient length. The lightest possible saw and the shortest practicable guide bar provide a sound ergonomic combination.

597. Except for very small trees (for example less than 100 mm diameter) axes should not be used for felling, because the felling direction is difficult to control; furthermore, the workload and amount of timber wasted are much higher than when felling with a saw.

598. The following felling aids should be available to assist in ensuring safe operations:

(a) a breaking bar or lever;

(b) a small and a large alloy or plastic wedge;

(c) a sledge or splitting hammer;

(d) a turning hook or a turning strap;

(e) an axe (for clearing and debranching);

optional:

(f) a tree jack;

(g) a felling cushion; or

(h) other felling aids as appropriate.

599. Iron wedges should not be used in any case.

600. Specially designed tools should be used for manual debarking, as they reduce the workload considerably compared to a machete or other tool not designed for this purpose.

601. Cutting edges should be maintained in good working condition, and kept sharp and safe at all times.

602. Chainsaws used should be specifically designed for tree felling and equipped in accordance with the following provisions and they should incorporate:

(a) separate handles for both hands;
(b) an on/off switch which is reachable at hand on the throttle and when wearing gloves;
(c) a throttle control lock-out which prevents the chainsaw from being started unexpectedly, because two levers have to be pressed simultaneously;
(d) a rear hand guard for protection of the hand;
(e) an anti-vibration system the engine block and handles;
(f) a front hand guard with chain brake;
(g) a chain catcher;
(h) a spiked bumper, which allows the weight of the saw to rest on the log securely during crosscutting; and
(i) a chain guard for avoiding injuries during transport.

Operating a chainsaw

603. Only workers who have received information, instruction and training on the safe use of chainsaws should be assigned to operate chainsaws, and should be able to demonstrate their competence and skills with reference to:
(a) mandatory safety features on chainsaws;
(b) mandatory personal protective equipment;
(c) the correct and proper sharpening and replacement of the chain when appropriate;
(d) maintenance of motor, chain and guiding bar of the chainsaw;
(e) felling and cutting techniques according to the technical guidelines described in this code and/or according to national regulations; and
(f) basic first aid.

604. To reduce the health risks arising from chainsaw operations, such as exhaust gases, noise and vibration, the duration of chainsaw work should be minimized as far as practicable by rotation with other tasks which do not require the chainsaw; these might include: sorting end products, scaling, machine operating, chokering and involvement in the planning and control of the operation. Operators should preferably not work with a chainsaw under load for more than five hours per day.
(Note: This limit is usually achieved by a combination of refuelling, maintenance, other work and rest periods unless excessive overtime is undertaken.)

605. The carburettor should be adjusted in a way that the chain is stationary when the engine is idling.

606. The functioning of the chain brake should be tested before each use.

607. When starting the chainsaw, a safe distance from other persons should be maintained. It should be ensured that the saw chain is clear of obstructions; the saw should be placed on the ground and secured with a foot on the base of the rear handle, or the rear handle should be gripped firmly between the thighs. Another method may be used, if it has been assessed as safe by a competent authority or a competent person.

608. When working with the saw, a firm stance and hold of the saw close to the body should be maintained with both hands on the controls. The only way to avoid kickback is to ensure that the upper tip of the guide bar does not touch anything.
609. Chainsaws should not be operated above shoulder height because of the risk of kickback and the resultant backward rotation of the guide bar.

610. Chainsaws should always be switched off or the chain brake engaged when moving.

611. When fuelling a chainsaw, a safe distance from all sources of ignition should be maintained and the chainsaw should be turned off. Smoking when fuelling should be strictly prohibited. Containers for chainsaw fuel should be clearly labelled and have securely fitting caps. Plastic containers should be designed and approved for use with petroleum spirit.

612. Nobody should ever work with a chainsaw alone unless the requirements of paragraph 422 are met.

**Operation**

613. Felling operations should only be carried out in daylight hours or with adequate lighting and in weather conditions which allow good visibility. When the wind is too strong to allow safe directional felling, felling operations should not be undertaken.

614. Felling operations should only be undertaken when a safe stance can be maintained; felling trees uphill should normally be avoided unless the tree has a pronounced lean in the uphill direction, with particular care to be taken on steep or icy slopes.

615. When carrying out felling operations in old growth or natural forests, particular attention should be paid to intertwining branches, climbers and dead trees.

616. Only those persons who have duties associated with felling, conversion or debranching activities should enter the work area. Before entering the work area, any other person should make their intention known to the operatives and receive an assurance that conditions are safe for entry.

617. Workers should, and be encouraged by the employer to, seek assistance or advice for any situation where they have safety and health concerns related to the task to be undertaken.

618. When starting to fell a tree, workers should ensure that nobody who is not involved in the felling is in the felling area. The safety distance is at least twice the height of the tree being felled.

619. Escape routes should be identified in advance and kept clear of brush, tools and other obstructions that would impede a quick escape.

620. The base of the tree should be free from obstacles, and fellers should assure that they are able to maintain a balanced stance.

621. All felling cuts, including the main felling cut, should be made at a sufficient height above the highest ground level to enable the worker to make the cut safely, control the felling direction and have freedom of movement to step away from the stump when the tree starts falling. Generally, trees should be felled as close to the ground as the conditions permit.

622. Any felling technique that has been assessed as safe by a competent authority or training institution may be used. Where no technique has been assessed as safe or in addition to these, the recommended technique for felling trees with a butt diameter which is less than twice the effective guide bar length is as follows:

(a) Reduce buttresses as necessary, to achieve a more or less cylindric tree-base to facilitate directional felling.

(b) Cut a front notch, at a 90 degree angle to the direction of fall and having a depth of one fifth to one quarter of the butt diameter; the top and bottom scarf cuts of the notch should meet exactly. Any over-cutting could weaken the hinge.
(c) Make the main felling cut, which should be slightly higher than the bottom scarf cut of the notch and leave a hinge of about one tenth of the butt diameter. This hinge is essential to guide the tree in the planned direction of fall.

623. When felling large trees, wedges or a breaking bar should be inserted into the back cut to prevent the tree settling back and jamming or trapping the saw; this will also help to push the tree in the designated felling direction.

624. When the back cut is deep enough to allow the tree to fall, the tree should be brought to fall using a lever or a wedge. The tree should not be completely severed, in order to preserve the hinge and so keep control over the planned felling direction.

625. The standard technique should be modified if the trees:

(a) have a one-sided crown or a significant lean;
(b) are leaning in a direction opposite to that chosen for felling;
(c) have a diameter with more than twice the effective length of the guide;
(d) are systematically to be brought down with winch support;
(e) are dead or have symptoms of rot.

In these cases, an appropriate modified felling technique should be used, adapting the depth of the notch, the shape of the hinge and the use of wedges according to the specific requirements.

626. When a metal lever is used in motor-manual felling, workers should make the felling cut so that the saw chain cannot touch the lever.

627. When the tree starts falling, the adjacent canopy should be watched carefully for branches or treetops which might be released from either the falling or neighbouring trees. Particular attention should be paid in dense stands and in natural or virgin forest, where intertwining branches, climbers or unstable trees could increase this hazard.

628. All trees on which felling has started should be brought down safely before any further work is undertaken. If this is not possible, then the location and position of the cut-up or hung-up tree must be brought to the attention of all persons who may come into the risk zone.

629. Particular care should be taken in felling dead trees and in working around them. Stump height should allow maximum visibility and freedom of activity during felling. Whenever possible, dead trees should be felled in the direction of lean, using as deep a notch as necessary, to minimize the use of wedges and the consequential shock vibration.

Taking down cut-up or hung-up trees

630. Cut-up and hung-up trees are a potential hazard which present an unacceptable risk to workers and others, and should be taken down immediately using methods assessed as safe.

631. If a cut-up or hung-up tree cannot be brought down, for example because assistance is not available, the risk zone under and around the tree should be clearly marked and all personnel not directly involved in bringing down the tree should be excluded from the risk zone until the tree has been brought down safely.

632. When taking down hung-up trees, workers should strictly observe the following. They should not:

(a) work alone
(b) work under the hung-up tree;
(c) fell the holding tree;
(d) climb the hung-up tree;
(e) cut lengths from the butt of the hung-up tree except for small timber with less than 20 cm base diameter; or
(f) fell another tree onto the hung-up tree.

Failure to comply increases the risk of serious injury.

633. For the safe treatment of hung-up trees, one of the following methods should be used:
(a) cutting the hinge unequally so as to leave a pivot, then rolling the tree using a turning hook or cable of sufficient size and strength to release the crown from the holding tree, enabling it to slide down the stem of the holding tree;
(b) levering the hung-up tree away from the direction of lean, using a sufficiently strong pole or a sulky until the tree falls to the ground;
(Note: methods (a) and (b) may require help from a fellow worker.)
(c) as for (b) but using a hand winch; or
(d) using a mechanical winch for example mounted on a skidder or a forwarder to pull the cut-up or hung-up tree down. When a mechanical winch is available, it is the safest option.

Manual and chainsaw debranching

634. Workers should ensure that trees are in a stable position before any debranching commences.

635. When trees have been felled across a slope, the lower side branches should be removed first to ensure that most of the debranching can be done from the relative safety of the upper side.

636. Workers should adopt a secure and balanced stance.

637. When debranching using an axe, workers should maintain a safe stance and ensure that the stem is between their body and the branch being cut.

638. When debranching using a chainsaw, workers should:
(a) conduct a thorough analysis of the tension and the compression of each branch. A small cut should always be made in the area of compression concluding the debranching at the area of tension.
(b) keep the saw close to the body and support the weight of the saw on the tree or the right thigh;
(c) not walk when debranching the near side of the stem;
(d) keep the feet well away from the chain when debranching the far side of the stem;
(e) keep a safe distance of 3–5 m between workers;
(f) beware of branches and undergrowth under tension, and watch out for spring back;
(g) not cut branches with the tip of the bar (risk of kickback);
(h) not allow the tip of the bar to contact uncut branches, supporting logs, butt ends or other obstacles (risk of kickback);
(i) maintain a firm grip on both handles of the saw whenever the chain is moving; and
(j) not reach across the guide bar to move a loose branch.
Manual and chainsaw crosscutting

639. Workers should carefully examine a log and its location before crosscutting, to determine which way it will roll, drop or swing when the cut is completed.

640. Workers should not work on the downhill side of the log being crosscut unless this is unavoidable; in this case the log should be blocked or otherwise secured to prevent rolling.

641. On sloping ground, logs should be completely crosscut. If it becomes dangerous to complete a cut, the log should be marked as a hazard using clear and unmistakable signs.

642. Whenever it seems likely that the guide bar will become jammed before the cut is complete, the notch should be kept open by using a wedge.

643. Logs under tension should be crosscut by making the first cut into the compression zone.

644. Cuts should be made from whichever side of the stem will not spring towards the operator when the log is severed.

14.2.2. Mechanized felling

Organization

645. Skid trails and tracks over which harvesting machines will travel should be planned and marked with unmistakable signs before mechanized harvesting operations are started.

646. Mechanized felling should be planned to avoid endangering other persons in the working area.

647. The operator should be trained and competent in the use of the machinery according to the identified hazards.

648. Mechanized harvesting should not be carried out in site conditions where the stability of the machine cannot be assured. Equipment should not be operated on slopes exceeding the maximum gradient specified by the manufacturer or exceeding that which has been assessed as safe by a competent authority or a competent person.

649. In order to minimize musculoskeletal disorders and mental stress in machine operators, adequate work organization, which may include job rotation and suitable shift schedules, should be encouraged.

Equipment

650. The machines should be designed and equipped to provide control over the direction of fall of the tree.

651. The risk zone specified by the manufacturer should be clearly marked on the machine in a position visible to any observers or bystanders.

652. Operators should use safety footwear which provides a good grip on the prevailing ground conditions.

653. When noise inside the cab of the machine exceeds a level of 85 dB(A), operators should wear suitable hearing protection.

654. For working in poor light conditions, adequate lighting should be fitted on the machine.

655. Machine operators should be able to communicate with each other using devices such as two-way radios or mobile telephones.
Tracks or chains should be fitted to the machine whenever the ground conditions hamper machine traction or stability.

**Operation**

Operators should inspect cutting equipment for signs of excessive wear or damage at least once a day, and ensure that all parts of the cutting equipment are properly aligned and maintained.

Saw chains including depth regulators should be sharpened and maintained according to the manufacturer’s recommendations.

Driving and operating on side slopes should be avoided whenever practicable.

The machine should not be destabilized by overloading.

When manoeuvring the machine, the operator should ensure that the grapple, harvesting and processing unit are in the correct working or transport position.

Work should be stopped immediately when any person enters the risk zone specified for the machine or comes closer than two tree lengths plus the length of the boom, whichever is greater.

Anybody approaching a machine should do so in full view of the operator, before entering the risk zone, and await the operator’s authorization.

Processed material should be left in a safe and stable position with safe access for extraction machinery; the maximum height of the pile should be specified based on the risk of objects falling.

The machine should be parked on level ground; with the transmission placed in the park position specified by the manufacturer, with the parking brakes or brake locks applied; and with the wheels chocked if necessary.

When parking the machine the operator should ensure that:

(a) hydraulic equipment is left in lowered position;

(b) hydraulic pressure is de-activated where possible; and

(c) saw teeth are in guarded position and knives closed.

14.2.3. Clearance of trees damaged by natural disturbances

**Organization and equipment**

Clearing trees damaged by natural disturbances such as windblow, fire or snow breakage is one of the most hazardous operations in forestry. Employers should make sure that no intervention takes place before the situation has been fully appraised and the operation adequately planned.

Workers should not work alone when manually clearing trees damaged by natural disturbances. Preference should be given to mechanical clearing.

In areas where natural disturbances impacting forests are common, contingency plans and checklists should be available to help staff to address the situation in an organized manner.

Only workers fully competent in felling, taking down of hung-up trees, debranching and crosscutting of stems under compression/tension should work on windblown trees. If this operation has to be carried out using handheld machines, work organization should ensure that safety has priority.

Prior to clearance of windblow, all workers engaged in the operation should be instructed about the specific hazards and risks connected with that task and risk control measures to reduce the
risk to an acceptable level, particularly with cutting and handling wood under compression/tension, and the methods to be used when dealing with trees which are lying on top of or across each other.

672. Working hours and rest periods should be strictly adhered to, to reduce the risk of accidents due to fatigue and loss of concentration.

673. While the clearance of windblow has not been completed, no work should be undertaken in the risk zone, unless completely unavoidable.

674. Work should commence and be carried out in the felling direction of the windblown trees.

675. The safest method available should be selected for the clearance of windblow, including maintaining a safe working distance between workers and between workers and machines used.

676. No worker should be allowed on site before the trees have been disentangled by mechanical means, where possible.

677. Clearance of windblow should not be undertaken without a winch being readily available. Mechanized methods of clearance should be used whenever practicable.

Operation

678. Workers should not walk or work under unstable windblown trees or root plates and not walk on the stems of windblown trees.

679. Suitable and safe escape routes should be selected and be cleared of any obstructions which could hinder a quick escape.

680. If there are trees lying over each other, manual or work using handheld machines should start with the tree on top. Progress of work on a fallen tree should be from butt to tip whenever practicable.

681. Workers should look out carefully for dead wood, insecure branches and broken tops, both in the trees to be felled and in the adjacent ones.

682. Tension in stems and root plates and the direction of such tension should be observed carefully.

683. Severing a fallen tree from the root plate is among the most hazardous tasks in forestry work. Whenever practicable, the severing cut should be made by machines, i.e. by using mechanized fellers like harvesters, feller-bunchers, excavator-mounted shears or similar equipment.

684. Root plates should be secured with winches or other suitable means to prevent them from falling onto the operator severing the stem.

685. A severing cut at the butt end of the stem should be made at a safe distance from the root plate. If necessary, a block measuring about half the diameter of the root plate should be left on the root plate to prevent it from falling over after being severed.

686. The first severing cut should be made into the compression wood. To reduce the danger of the stem springing upwards, the final severing cut should be made into the tension wood a hand's breadth away from the first cut, and into that part of the stem which is least likely to move.

687. When lateral tension is present in the stem, the worker should always stand on the compression wood side to make the final cut.

688. Whenever feasible, a winch should be used to restrain stems under tension.

689. Every effort should be made to put the root plate back in place once the stem is severed, preferably using a machine or a winch to pull it back.
690. Leaning trees should be felled using a modified felling technique in order to avoid the saw being pinched when making the scarf cuts and to ensure that tension is released slowly and in a controlled manner to avoid splitting of the tree during the backcut, which can be very hazardous.

691. Broken treetops should be pulled down using a machine, from a safe distance. If a machine is not available, the tree should be felled sideways.

692. Topless tree trunks should be felled by using a bigger notch than normal and controlling the felling direction with wedges.

693. When trees have been severed from the root plate they should be extracted to a place where debranching and conversion can be undertaken safely.

14.3. Extraction

14.3.1. General provisions

694. Specific local conditions require different extraction methods to ensure safe operations and should be selected after taking the following factors into account:

(a) terrain of the land;
(b) structure and type of soil;
(c) forest cover types;
(d) type of silvicultural operations, e.g. clear-cutting or selective thinning;
(e) harvesting method, whether pole length, shortwood or whole tree system;
(f) presence of streams or wetlands;
(g) presence of protected or environmentally sensitive areas;
(h) existing and required infrastructure; and
(i) climate conditions.

695. Extraction routes suitable for the extraction method and direction should be planned prior to the operation and clearly marked in the working area.

696. Generally, logs should be prepared prior to extraction operations by cutting them into the designated specification, to control the weight of the load and minimize damage to remaining trees.

697. Where a quick extraction cycle is required, individual loads should be prepared by setting chokers to the individual logs well ahead of the arrival of the extraction vehicle, aircraft or other means.

698. For safety and environmental reasons, extraction operations should be suspended during inclement weather.

14.3.2. Manual extraction

Organization

699. Lifting and carrying wood manually should be avoided whenever possible. Where it cannot be avoided, transport distances should be kept as short as possible by using an appropriate felling direction and a sufficiently close network of extraction routes.
700. Weights should be reduced wherever possible by splitting or crosscutting prior to manual carrying, according to the assortments required.

701. Provision should be made for adequate rest periods at regular intervals.

**Equipment**

702. Manual handling aids should be provided to reduce the risk of manual handling injuries.

703. Sulkies or similar equipment should be used, where practicable, to minimize the workload in manual handling.

**Operation**

704. Where not specified otherwise in national laws and regulations, the weight of timber handled manually by one worker should not exceed a level likely to jeopardize health or safety.

705. Workers should keep their backs straight and use their leg muscles when lifting. Loads should be kept close to the body and be well balanced. Workers should select their path carefully and avoid obstacles.

706. If logs are carried by more than one person, the rearmost worker should give the commands for lifting and dropping. All workers should be on the same side of the log. When slopes are crossed the workers should be on the uphill side.

707. Rolling or sliding timber downhill should only be done when the down slope area is completely clear of other persons.

**14.3.3. Extraction by chute**

**Organization and equipment**

708. Chutes should be designed and installed in such a way that logs cannot jump out of the chute.

709. Gradients should be as close as possible to the minimum required for gravity transport (for example variable gradients). In difficult terrain, closed “full pipe” chutes are preferable to open chutes.

710. In steep terrain, appropriate braking devices should be installed in the chute.

**Operation**

711. Workers should stay well clear of the chute while it is in operation.

712. Only one log at a time should be transported in a chute, except shortwood with a length of less than 3 m.

713. If the landing area cannot be seen from the loading area, no log should be sent down until a signal to do so has been received from the landing.

714. Those giving signals should always be in a safe place, if possible behind trees which will provide protection if a log jumps out of the chute.

715. No log should be left lying in the chute. At the landing, the wood should be stacked on sites that cannot be struck by logs coming down the chute.
14.3.4. Extraction with draught animals

Organization

716. Extraction with draught animals should be considered suitable only for short distances (typically 200 m or less) and relatively gentle slopes (in general not more than 20–30 per cent when skidding downhill and not more than 10–15 per cent uphill).

717. Only animals with sufficient strength and endurance to cope with the strain of extraction work should be used. Animal health should regularly be assessed according to national law and practice, where appropriate.

718. The animals should be fed, watered and rested according to their physical needs. Only persons familiar with the animals’ needs and behaviour should work with them.

719. Undergrowth on animal trails should be cut as close to the ground as practicable, and obstacles should be carefully removed.

720. Extraction should be synchronized with cutting as much as possible, and commence at the furthest point of the extraction route to avoid having to travel over branches, tops and other debris.

Equipment

721. Suitable harnesses should be used to avoid injury and reduce physical strain on the animals when they are pulling the load.

722. Skidding pans, sledges or sulkies should be used to reduce friction between the load and the ground.

Operation

723. Persons guiding animals should always walk beside the animal and on the uphill slope side of the load or behind the load when long reins are used.

724. A safety distance of at least 5 m should be maintained between the front of the load and the animal.

14.3.5. Extraction by tractors and all-terrain vehicles

725. Farm tractors and all-terrain vehicles (ATVs) not equipped in accordance with the provisions in Chapter 7 should not be used for skidding activities. When tractors are equipped with roll-over, falling object, and operator protective structures, they should include harness or seat belts. The employer should ensure that workers who operate tractors or ATVs are fully informed, trained and supervised in the safe operation of the tractor or ATV, including any towed equipment or attachments, such as timber trailer or skidding arch, with regard to the operator, other workers, bystanders and others.

14.3.6. Extraction by skidder and winch

Organization

726. When an employer is conducting ground skidding/extraction work, whether cut to length, full log uphill or downhill, the following practices should be followed to ensure the stability of the machine and safety of the machine operator:
(a) no winching at an angle that could cause the machine to tip over;
(b) avoiding obstructions and hang ups that could contribute to roll-over;
(c) ensuring that the log bundle is wrenched tight to the machine apron, for cut to length
forwarders that the logs are stable within the log support system;
(d) selecting a suitable gear to maintain control of the machine when ascending or descending
slopes;
(e) dropping the log bundle if an unchoked log or debris becomes caught in the log bundle;
(f) avoiding abrupt turns when moving up or down slopes;
(g) minimizing any cross slope travel to prevent roll-over potential;
(h) operating the skidding machine within manufacturers’ specifications and those adopted by
a competent authority;
(i) when using skidding with hauling attachments such as wagons, carts, sleighs and others,
they should be compatible with the towing machine and not contribute to roll-over potential
of the machine;
(j) if skid trails are not being used, skidding should be conducted in a manner that the machine
travels straight up or down the slope; and
(k) when power take offs (PTOs) are being used they should be adequately guarded and have a
slip clutch.

727. Skidding machines should not be operated on slopes steeper than specified in the manufacturer’s
instructions.

728. In the planning of the activity, a system of trails for skidding should be designed and clearly
designated and on which only skidders should circulate in accordance with national legislations.
Designated skid trails should be used. Skidders should remain on these designated skid trails and
logs should be hauled to the trail by means of the winch.

729. Skid trails should:
(a) be marked clearly;
(b) be as straight as possible;
(c) on slopes be run at a slight angle across the slope rather than straight up and down; and
(d) be clear of any obstacles which might impede the operation or cause skidder instability.

730. Stumps on skid trails should be cut as close to the ground as practicable.

731. The skid trail width should be the minimum practicable to allow the skidder to travel safely without
damaging remaining trees alongside the trail. Where necessary, for example in dense crops, an
adequate number of turning places should be planned.

732. Skid trails should not cross streams or gullies unless unavoidable. In this case, the stream bed
should be protected, for example with a culvert, logs or rocks. These should be removed when no
longer needed.

733. Along the entire length of a skid trail, work should only be permitted if a safe distance from the
trail is maintained. This distance should be a minimum of the total length of the skidder plus the
load unless protection is equally provided by standing trees.

734. Unmistakable signals should be agreed upon and used among the members of a skidding crew.
Equipment

735. Skidders should be sufficiently powered and of appropriate size for the dimension and weight of the load to be extracted.

736. They should be equipped:
   (a) in accordance with the requirements in Chapter 7;
   (b) preferably with high-flotation tyres;
   (c) with a loading shield, butt plate and protective grill;
   (d) with an underbody protective plate;
   (e) with a powered winch with at least 30 m of wire rope having a breaking strain of at least twice the pulling capacity of the winch; and
   (f) with an arch or other support which will suspend the front end of the load to prevent logs from digging into the ground as they are being skidded.

737. Remote-controlled winches should be used if available because this makes it easier to maintain a safe distance from load and rope.

738. Cables used on skidder-mounted winches should be:
   (a) of sufficient size and strength and comply to the winch manufacturer’s specifications;
   (b) securely fixed on the drum; and
   (c) neatly and tightly wound on the drum.

739. Cables, pulleys and chokering equipment should be inspected regularly for damage and signs of wear. Broken or badly frayed cables should be repaired by splicing or be replaced. For fitting, the securing device or method specified by the manufacturer should be used.

Operation

740. Skidding should not begin before the area is abandoned by workers not engaged in the operation.

741. When getting in and out of the cab, the skidder operator should always face the cab.

742. Skidding across slopes should be avoided, due to the significant decrease in skidder stability.

743. The rear of the skidder should be positioned facing the load. Excessive side hauling should be avoided.

744. Skidders should be securely braked, and stabilizers and butt plates left in the lowered position when the winch is operating.

745. When chokers are set or removed, it should be ensured that the log will not roll.

746. Choker cables, chains or tongs should be placed securely and sufficiently close to the end of the log, keeping the shortest practicable length between the log and the winch line when chokers are used, the junction with the cable should be done in a way in which it should remain stable ensuring that all of the endings of the cable are secured before using them.

747. A minimum of three turns of cable should be left on the drum when pulling out the cable. In practice this means that the maximum hauling distance will not exceed 25 m when using a 30 m cable.
748. The winch loading should be well within the pulling power of the winch and the breaking strain of the cable.
749. The load should be winched close to the butt plate.
750. Walking alongside the load should be avoided. The activity should cease when an operator is in close proximity to a work activity which is less than twice the length of the cable.
751. On slopes, workers should always be on the uphill side of the load.
752. When logs are skidded around bends, any worker present should stand on the inside of the curve or preferably use the protection of standing trees.
753. No person should sit or stand on the moving load or attempt to reposition it physically.
754. If the load is hung up, the operation should cease and the tension on the cable has to be released and the load freed.

14.3.7. Extraction by forwarder

Organization
755. Logs loaded on a forwarder should be relatively uniform in length.
756. The operation of forwarders should in general be restricted to slopes not exceeding a gradient specified by the manufacturer.

Equipment
757. The safe working load and reach of the crane should be clearly marked on the main boom.
758. Tracks or chains should be fitted according to the ground-bearing capacity and condition.

Operation
759. Grapples should not be operated if any part of the machine comes within 15 m of overhead electric lines suspended from steel towers, or 9 m in the case of wooden poles.
760. Work should be stopped if anyone comes within a distance equal to twice the reach of the loader.
761. Grapples should be parked correctly before driving the forwarder.
762. The stability of the machine should always be maintained, by operating only under conditions which are within its technical capacity.
763. Excessive side slopes should be avoided. Where work has to be undertaken in severe side slope conditions, the boom should be extended on the high side to increase stability. Turning uphill on side slopes should be avoided.
764. When loading on sloping ground, the machine should be parked straight up or down the slope. Any convenient stumps or other obstructions should be used to chock the wheels.
765. The loader or carrier should not be overloaded or loaded above the level of the headboard or the stanchions.
766. When ground conditions are severe, the load should be reduced accordingly.
767. When loading and unloading, the parking or loading brake must be applied.
768. The load should be fully encircled when the jaws are closed.
Before driving down steep slopes, the brakes should be checked and the low gear and differential lock engaged.

When the machine is not operating, brakes should be applied and all hydraulic equipment should be parked in lowered position.

14.3.8. Extraction by cable or cable logging

Organization

Cable logging is a hazardous activity with specific risks including being hit by rolling logs or other objects while working on steep slopes below the landing, injuries caused by rope wire, and being struck by failing equipment.

To help protect workers from cable logging hazards and risks, the following general safety principles should be applied:

(a) Stop operating if cable logging becomes dangerous because of high fire danger or inclement weather conditions, for example high wind or poor visibility.

(b) Everyone should stay in a safe area away from moving lines, rigging, loads or standing skylines until the rigging or loads have completely stopped.

(c) Everyone should remain outside the hazard zone of tensioned running lines.

(d) No one should ride on hooks, carriages, ropes or other rigging.

(e) No one should ride on logs suspended in the air or being moved.

(f) Tree felling activities should be a minimum of two dominant tree lengths ahead of active yarding lines and ground workers.

(g) Lines should be run in a straight line and not be obstructed.

Cable lines, spar and anchor trees should be planned well in advance of the felling and extraction operation and clearly marked in the working area.

Cable cranes should be installed and operated only by-competent workers.

Spar and anchor trees should only be climbed by trained and experienced climbers (see Chapter 13.7 on tree-climbing).

Spars and support trees should be examined carefully for defects before being selected. They should be sound, straight, green and of sufficient diameter to withstand the strains to be imposed.

The tower of a mobile cable crane should be anchored securely by at least two ropes secured as far back as possible, in accordance with the manufacturer's recommendations.

Anchor ropes should have a minimum angle of 45 degrees from the vertical at the tower and spar trees, whenever possible.

Trees and stumps used for anchors should be free of rot, secure and of sufficient size. Stumps should be notched to provide a secure hold for the strop. Anchors need to be checked daily to ensure that the stumps continue to provide the needed support.

Efficient cooperation and communication between workers is essential in cable crane operations. Clear and unmistakable communication signals should be agreed upon and used among the members of a cable crane crew.
Equipment

781. The cable crane system should be equipped with cables and components complying with the manufacturer’s recommended specifications, and be in serviceable condition. All blocks, hooks and shackles should be clearly marked with the safe working load.

782. Two-way radios should be used for communication among a cable crane crew, whenever practicable. If there is radio interference, the operation should cease, unless other effective means of communication are in place.

Operation

783. The weight of the load should not exceed the manufacturer’s recommended safe working load, which should be clearly stated on the machine.

784. No other operation should be carried out within a distance of 20 m of the system while the winch ropes are in motion.

785. During high-lead hauling, it is essential that nobody is endangered by the suspended load.

786. Anchor ropes should be kept tight and secure at all times.

787. Ropes should be securely fastened to winding drums and at least three turns of rope should remain on the drum when operating.

788. Damaged or broken anchor ropes should be discarded or, when appropriate, be repaired by splicing. The splice should be as long in metres as the diameter of the rope in millimetres, i.e. a 9 mm rope requires a splicing of 4.5 m on each side of the join (9 metres in total).

789. The winch operator should work only on recognized signals.

790. The winch operator should obey the “stop” signal immediately. Any unidentifiable signal should be interpreted as a “stop”.

791. The working area around the winch should be kept clear of any obstacles.

792. Side hauling should be done at the minimum engine speed practicable.

793. Choker setters should:
   (a) keep at least 2 m away in thinning and an appropriately greater distance in clear fell from either side of the cableway when the cables are in motion;
   (b) position themselves behind the load or behind standing trees during side hauling; and
   (c) not attempt to free any obstructed load when the hauling ropes are under tension.

14.3.9. Extraction by helicopter

Organization

794. Before starting work, all parties involved should hold a safety briefing to plan for safe operations and to make them aware of the hazards and risks inherent in helicopter operations.

795. Because the productivity of helicopter extraction is so high, cutting operations tend to involve large numbers of workers who would be at risk during the extraction phase. Felling and conversion should therefore be undertaken well in advance of the extraction operation to reduce these risks.
796. If felling and other work proceed during helicopter extraction, flight routes should be established and observed so that workers are not in danger from dropped or aborted loads.

797. Landing areas should be planned and prepared to provide enough space for the safe dropping of timber and adequate room for workers releasing chokers from stacked logs. These preparations should also allow all personnel to stay well clear of the drop zone when the helicopter is delivering the load.

798. In addition to the landing, one or more graded areas should be prepared as landing pads for periodic refuelling and maintenance of the helicopter. Vegetation should be cleared away from these areas to permit adequate clearance for the helicopter’s rotor blades during landing and take-off. The location should facilitate an emergency landing of the helicopter if required. The refuelling pad should be placed sufficiently far away from the log landing that it will not cause any risk to persons working on the landing.

799. Because of the quick turnaround rates of the helicopter, work should be organized so that loads are chokered well before the arrival of the helicopter, following a pre-arranged transport pattern.

800. Visitors to a work area should have prior approval of the supervisor that should ensure they either: are supervised so that they are not harmed in the place of work; or remain in a designated visitor area providing a good view at a safe distance from the log landing and helicopter landing.

801. All personnel engaged in helicopter extraction operations should be trained in radio communication and hand signals.

802. All personnel should be instructed and made aware of the risk zones around a landed or hovering helicopter, and they should know the procedures to be adopted when approaching a landed or hovering helicopter.

803. In the loading zone and at the landing, at least one member of the helicopter ground staff should be assigned to direct the pilot to the designated loading and dropping position, by radio and hand signals.

Equipment

804. Helicopters used for extraction should be equipped with:

(a) an emergency release hook;

(b) a tether line of sufficient length according to the topography and the height of any tree above which the helicopter hovers;

(c) a hook attached to the tether line which allows remote control release of the load on the landing; and

(d) helicopter load lines with an effective static discharge line to ensure that ground workers do not receive electric shocks.

805. Chokers should be of sufficient length to allow a secure attachment of the logs to the load hook. A sufficient number of chokers should be available.

806. All persons engaged in helicopter extraction should be provided with two-way radios.

807. Signs, signals or other means of blocking the loading areas and landings, as well as public roads to unauthorized entry, should be available if required by the local conditions.
**Operation**

808. The helicopter should not fly directly over workers or inhabited areas when carrying a load of logs or other suspended load.

809. Helicopter ground staff, forestry crews and pilots should keep in radio contact at all times.

810. Workers not visible from the air should report their location at regular intervals to the pilot or helicopter ground staff.

811. Pilots should follow the ground staff’s commands when being directed to the loading and dropping zone by radio and/or hand signals.

812. All forestry personnel should strictly follow any instructions given by the pilot or helicopter ground staff at all times.

813. All personnel should follow strictly the pilot’s instructions at all times and be aware of the risk zone associated with moving rotor blades.

814. Chokers should be attached securely to the logs, ensuring that logs do not slip out of the choker and that chokers are positioned sufficiently far away from the point of balance of the load that it is suspended vertically when lifted.

815. During flying operations, no work should be carried out on the landing other than that which is strictly necessary, such as the release of chokers and safe placement of logs. When chokers cannot be released safely, they should be left in place.

816. During the approach, load dropping and departure of the helicopter to and from the landing, all work on the landing should be immediately stopped and all personnel should stand clear, preferably on the pilot’s side of the helicopter.

817. During dry spells, the log landing area and helicopter refuelling and maintenance pads should be watered to reduce dust levels, which may impair visibility and interfere with the safe operation of the helicopter.

**14.3.10. Log landing and stacking areas**

**Organization**

818. Where applicable, logging operations should be planned to allow for:

   (a) stems, stockpiles and log stacks;

   (b) safe areas;

   (c) safe access for the type of trucks and volume of traffic which is required, and appropriate parking facilities;

   (d) fuel and chemical storage;

   (e) load-out areas;

   (f) where applicable, the yarder to be safely positioned; and

   (g) truck turn around.

819. All landings should be planned and constructed to allow safe operations.

820. The landing and stacking areas should be located so that a safe distance is maintained between the loading equipment and the power lines.
821. Piling and loading should be mechanized as far as practicable, to avoid heavy physical strain and the risk of accidents associated with manual handling.

822. Landing location and design as well as stacking places should be identified during harvesting planning.

823. Landings should be well drained.

824. During prolonged dry weather, landings may need to be watered to reduce dust.

Operation

825. Landings should be kept as clear as possible.

826. Logs should be approached only after they have been completely landed and, if necessary, stabilized.

827. Produce should be stacked on firm, level ground or some other sound base.

828. Stacks should be made and maintained in a stable and secure condition.

829. Stacking on top of steep roadside banks should be avoided.

830. Timber should not be stacked higher than necessary. Where there is additional manual handling, the height of stacked timber should not exceed the shoulder height of an average forest worker.

14.3.11. On-site processing

831. Careful planning of on-site processing activities is important to help ensure the site is big enough and products are removed from the processing site as it is generated to prevent the site becoming cluttered.

832. On-site processing activities such as chipping, portable sawmilling and firewood collection should be carefully planned. The area for on-site processing activities should be suitable to conduct operations safely within the landing area, designed and planned to allow for safe operation, sufficient distance from any settlement, with sufficient space and amenities for delivering and storing logs and machine refuelling and maintenance.

833. The processing site should be separated from other workers as material can be thrown long distances, for example if machinery disintegrates, logs are fed through incorrectly or foreign matter hits the spinning blades.

834. Machine operators, truck drivers and site visitors should be able to communicate by radio or other effective means with other workers in the operation.

835. Logs should only be moved and lifted by machines fitted with roll-over protective structures (ROPS), falling object protective structures (FOPS) and operator protective structures (OPS).

836. Only competent workers should carry out on-site processing activities. The risks from log handling and operating machinery during on-site processing are significant unless appropriate risk control measures are in place.
14.4. Loading and transport

14.4.1. Loading

837. Manual loading should be avoided. If it is unavoidable, a risk assessment should be conducted to identify appropriate risk control measures, for example hand winches, sappies, timber-picks, hooks, tongs or similar aids, which can be used to reduce physical strain.

838. Vehicles being loaded should be parked safely and braked securely.

839. No person should be in the cab or on the platform of the vehicle while loading is in progress, unless the cab of the vehicle is adequately protected.

840. Trucks should not approach a landing area when there is danger from incoming produce.

841. Workers should remain outside the risk zone during loading operations.

14.4.2. Road transport

Infrastructure

842. The planning, construction and use of the forest road network, drainage structures and water crossings should be done in alignment with national laws and regulations. These include:

(a) Forest roads that are used in wet weather conditions should be properly drained and constructed with a rock base and a surface of gravel or other durable material.

(b) Forest roads and bridges should be maintained properly and in a timely manner, to allow heavy vehicles to travel safely without causing damage to the road surface.

(c) Risk mitigation measures should be introduced, including bearing measurements, when driving on frozen lakes, rivers, and marshes.

843. During maintenance or harvesting operations taking place adjacent to roads used by others, the employer should implement traffic controls where necessary and put up signs warning of the tree felling activities.

844. The gradient of forest roads should, wherever practicable, not exceed 10 per cent unless specified by the manufacturer of the truck and trailer.

845. Truck transport—operations should be tailored to the bearing capacity of roads and to minimize the impacts and damage on low-volume roads and the road network.

Operation

846. Truck drivers involved in forestry operations should observe national laws and regulations, in particular with regard to the appropriate training, licensing and certification requirements, traffic regulations, vehicle type selection, and maximum load; and be able to conduct routine servicing and minor repairs as required by such vehicle.

847. A daily, full inspection should be made of trucks and trailers, load bunks/stanchions, stakes or uprights and cab guards, paying particular attention to the steering mechanism, lights and reflectors, brakes, boosters, brake hoses and connections, reaches, bunks, bunk blocks and couplings. Any defect which makes the vehicle unsafe to operate should be replaced or repaired before the vehicle is put back into service.
848. Wheels should be checked regularly for cracks and loose or missing lug bolts/wheel nuts, and any defects should be rectified. The tyre pressure and tyre condition should be regularly checked and rectified or replaced as necessary.

849. Routes should be selected taking into consideration road infrastructure, fatigue management practices, and safe manoeuvring to support loading and unloading operations.

850. Riding on any part of a timber truck other than in the cab should be strictly prohibited.

851. Truck loads should be properly balanced and secured by binders that are of sufficient strength to prevent logs from becoming dislodged or shifting in transit. No part of logs on the outside of the load should be loaded above the top of the stanchions or the stanchion extensions.

852. The truck should be loaded correctly, securely and not overloaded. This is best ensured by weighing the truck. Where no weighing facilities exist, tables of volume–weight ratios for common species as well as operator experience should be used, with the necessary caution. In line with the Guidelines on the promotion of decent work and road safety in the transport sector (2019), the chain of responsibility requires each party in the road transport chain to comply with their individual responsibilities and in so doing increase safety and reduce the risk of preventable crashes and dangers.

Suitability of the vehicle, equipment and cargo transport units

853. Timber trucks should be sturdy and reliable, and able to operate on forest roads.

854. The trucks should be maintained and equipped to comply with the requirements of national laws or regulations concerning road safety. This applies equally to timber trucks operating only on private forest roads.

855. To protect the cabin from falling objects or penetration by a load, including during a vehicle accident, timber trucks should incorporate a cab guard between the load and the cabin.

856. While operating in remote areas, trucks should be equipped with two-way radios or mobile telephones.

857. A safe and adequate means of access to and egress from the loading workstation should be provided on self-loading trucks.

858. Working and walking surfaces on vehicles should be designed and constructed to eliminate slippery conditions.

859. Heavy and irregular cargo items such as timber logs should preferentially be carried only on platform or flatrack cargo transport units and with adequate lashings such as long link chains.

14.4.3. Water transport

860. When water transport is used, special care should be taken when constructing and maintaining the area where the logs will be moved into the water or loaded onto the transport. The surface of the area should be constructed to the same standards as forest roads or landings.

861. Laws and regulations concerning safety of waterways should be strictly followed.

862. Manual handling should be avoided. If unavoidable, aid tools should be used for manoeuvring and placing such as sappies, timber-picks, hooks or tongs.

863. Timber rafts should be towed or pushed by boats with sufficient power to control the speed and direction of the raft in a safe manner.
864. Rafts should be securely bound using binders or chains of sufficient strength, in order to ensure the safety of other traffic using the waterway and to prevent the loss of timber. Flags and lights for night travel should be used to identify the front and rear of the raft clearly, in order to avoid collision.

865. All persons involved in water operations who are at risk of drowning should wear personal flotation devices.

15. Fire management

Organization

866. Fire management requires an effective organization and clear plans that can be carried out rapidly in case of an emergency. Priorities of fire management should be to:

(a) reduce the likelihood of fires;
(b) protect the safety and health of those working in forests, as well as others who might be impacted by fire;
(c) prevent damage to dwellings, infrastructure and equipment; and
(d) protect the forest.

At no time should the safety of human life be compromised in order to protect infrastructure, equipment or the forest.

867. Fire management planning should aim to minimize the risk of wildfires resulting from forestry operations, and such a plan should include:

(a) features of the forest area pertinent to fire risk and consistent with the requirements of national laws and regulations;
(b) measures to reduce/control ignition sources;
(c) arrangements to monitor the current and forecast weather, including fire danger rating;
(d) outline of the responsibilities and cooperation arrangements with the competent authority;
(e) communication protocols as of the early detection of the fire, including the closest employer and emergency plans;
(f) supplementary firefighting equipment on forest machines and vehicles;
(g) allocation of adequate staff resources and provision of suitable training for the task.
(h) implementation of the production and use of a land guide incorporating cartography reflecting main and secondary roads and water sources;
(i) provision and maintenance of fire breaks; and
(j) ensuring coordination between employers for fire prevention, early detection, suppression and control.

868. The risks involved should be assessed before firefighting commences. This assessment should take account of all factors relating to the current and forecast weather and fire conditions, available resources and equipment, with particular regard to the safety of firefighters. Risk assessment should take into account exposure to carcinogenic substances and potential
occupational diseases such as those listed in Recommendation No. 194 that workers are exposed to and that could result from firefighting operations. The personal protective measures needed to control these risks, including laundering of the work clothing, should be determined. Risk assessment should continue throughout the firefighting activity, as conditions can change quickly and unpredictably. Firefighting teams should receive a briefing that includes the results of the risk assessment and safety considerations, at the start of each operation and daily to ensure that safety is prioritized.

869. When preparing a plan of action, consideration needs to be given to the specific skills required of the firefighters.

870. Good communication between all those involved needs to be maintained at all times, during both training exercises and actual fire operations. All involved persons should be aware of the command structure and the need to ensure the safety of others, as well as to comply with all instructions issued by supervisors. Firefighting teams should have a supervisor whose responsibilities should include ensuring that all firefighters are aware of safety procedures and follow these procedures.

871. When planning a prescribed burning, certain groups, such as neighbours, fire departments, emergency personnel and law enforcement officials should be notified in advance, according to national laws, regulations and practice.

872. Machine operators should not work alone unless they are able to communicate immediately with other nearby firefighters in the event of an emergency.

873. Teams of firefighters should ideally include persons who are familiar with the terrain.

874. All roads and tracks in the area should be closed by the competent authority, if there is danger to persons not involved in the firefighting activity.

875. Sufficient rest periods and an adequate supply of food and beverages should be provided to avoid overexertion.

**Personnel**

876. People who engage in firefighting or prescribed burning activities should be in good physical condition. Prescribed burns should only be conducted by adequate and/or sufficient crew, adequate and sufficient to be determined based on local and, where non-existent, international guidelines in relation to size of the prescribed burn. Special firefighting crews should be recruited and meet the standards of national laws and practices.

877. All personnel who may be called upon for firefighting should be briefed on fire management plans and receive training including:

   (a) safe use of basic firefighting tools and equipment; and
   (b) measures to take in an emergency to escape a fire area.

878. Firefighters should receive special training and be competent in:

   (a) all relevant firefighting techniques and use of related equipment;
   (b) accident risks and prevention; and
   (c) first aid applicable to conditions commonly encountered in fires.

**Equipment**

879. Firefighters should be provided with and use:
(a) overalls of a suitable material to provide protection from heat radiation and sparks, in a highly visible colour; suitable fabrics include cotton, wool, denim or special flame-resistant material. Flammable fabrics or those that might melt, such as nylon or other synthetics, including safety trousers and chaps containing such fabrics, should not be worn;

(b) safety helmets, preferably with a fire-resistant face shield. When working close to helicopters, helmets should be secured by a chin-strap;

(c) goggles and smoke masks, when conditions require and other protection to reduce exposure to chemicals and physical agents;

(d) protective gloves which provide protection against cuts, punctures and heat penetration; and

(e) non-slip, calf-length boots with heat resistant and sufficiently stable soles.

880. Manual fire fighter crews and those engaged in prescribed burning should be provided with the following equipment, depending on the fire intensity and as appropriate:

(a) hoes and fire rakes;

(b) shovels;

(c) forest fire beaters;

(d) chainsaws and personal protective equipment and accessories;

(e) backpack sprayers;

(f) hoses and basic nozzles;

(g) carriers for the equipment and supplies; and

(h) lights (torch, flashlight, headlight) with reliable power source.

881. Firefighting equipment should be regularly inspected for defects before each fire drill and after use in an emergency. It should be maintained in accordance with the manufacturer’s recommendations.

882. Machines should be equipped and designed according to the provisions in Chapter 7. In addition, machines operated at night should be equipped with at least one forward and one rear light to ensure safe working conditions.

883. Lookout towers for the detection of forest fires should be of a solid construction and fitted with engineering controls to prevent falls. Stairways, platforms, fixed fall protection equipment and railings should be inspected annually. Tops of stairways should be closed by trapdoors to prevent accidents caused by falling.

Operation

884. All personnel engaged in fire management should avoid any unnecessary risks.

885. Firefighters should be informed about ways of access to and egress from the scene of the fire, including escape routes.

886. No one should work beyond the calling distance from another person.

887. Firefighters should work at a steady pace, and pause to recuperate when necessary. They should drink plenty of liquid to replace loss caused by excessive perspiration. When not at work, firefighters should remain in a safe area.
888. Firefighters should always stay within the burnt area at a fire or in firebreaks, roads or cleared ground. They should avoid being in the unburnt area.

889. If cut off by the fire, firefighters should try to move into an area which has already burnt.

890. Burning trees should be passed on the uphill side. Special caution is needed near overhead electricity lines.

891. When firefighting includes the felling and cutting of trees, the safety requirements for harvesting operations of this code should apply whenever practicable.

892. Firefighters working in close proximity to machines should do so, where practicable, with the knowledge, agreement and in direct communication with the machine operator, and only in accordance with any instructions by the supervisor.

893. Firefighters operating near an aircraft should abide by all instructions provided by the pilot or authorized ground personnel. When operating within the aircraft drop-zone for water, foam or retardant, firefighters should follow all safety and work instructions given by the supervisor.

894. When prescribed burning is undertaken, workers should adhere to the planned light-up pattern and not deviate from this unless they are instructed to do so. When using a hand burner, the operator should be within sight and sound of another person, generally not more than 20 m distant.

895. Vehicles should be parked in the direction of the escape route with doors closed, windows up and keys in the ignition, and in a position to allow other vehicles to pass in case of an emergency.
Glossary of technical terms

Anchor: A stump or tree to which the end of the skyline cable in a cable crane extraction system is securely attached.

Buttress: A ridge of wood that grows in the angle between a lateral root and the base of a tree stem, to provide lateral stability to the stem.

Cable: A flexible steel rope made up of numerous wire strands that are twisted helically together around a core of wire, wire rope, fibre, plastic or other material.

Cable crane: Any of a variety of terrain transport systems in which suspended cables are used to convey logs to the landing.

Cable logging: A yarding system employing winches, blocks and cables.

Cableway: The pathway along which logs are extracted with a cable crane.

Canopy: The part of the forest formed by the crowns of the dominant trees.

Choker: A noose of wire or fibre rope or chain that is wrapped around a log and then attached to a means of conveyance, in order to bring the log to a skidder or landing.

Conversion: The act of changing a felled tree into a utilizable product by means of debranching and crosscutting.

Crosscutting: The act or process of transversely cutting the stem or branches of a felled tree into logs (in North America referred to as “bucking”)

Cutting: In timber harvesting, a compound term referring to the operations of felling, debranching, debarking and crosscutting.

Cut-up tree: A tree that remains upright on its stump after all felling cuts have been made.

Debranching: The severing of branches from the stem of a felled tree (in some countries also referred to as “limbing”, “delimbing” or “sneading”)

Extraction: The act of transporting felled produce from the felling site to a landing.

Extraction route: The planned route over which produce is extracted from stump to landing.

Fall arrest system: A system used to arrest a worker in a fall from a walking-working surface. It consists of a body harness, anchorage and connector. The means of connection may include a lanyard, deceleration device, lifeline or a suitable combination of these.

Falling object protective structure (FOPS): A falling object protective structure or frame that protects the operator of forest machinery or vehicles against falling branches, parts of tree crowns or logs.

Felling: The act of severing a standing tree. Compare Cutting.

Forwarder: A machine used for the extraction of logs, which carries the load completely off the ground, either within its own frame or on a trailer. Forwarders are usually equipped with a hydraulic or mechanical crane for self-loading and unloading of logs.

Grapple: A hinged hydraulic mechanism capable of being opened and closed mechanically, which is used to grip logs during extraction or loading.
**Harvesting**: The aggregation of all operations, including pre-harvest planning and post-harvest assessment, related to the felling of trees and the extraction of their stems or other usable parts from the forest, for subsequent processing into industrial products.

**Hauling**: Conveyance of usable produce from the landing to the processing facility or other destination.

**Headboard**: A vertical construction positioned between the load and the cab of a vehicle used for the transport of timber (typically a forwarder or heavy goods road vehicle), with the specific purpose of protecting the operator.

**Hung-up tree**: This is a tree that has been cut, windblown or otherwise pushed against another tree, thus preventing it from falling to the ground.

**Kick-back**: A sudden, violent upward movement of the guide bar of a chainsaw caused by the chain on the upper tip of the guide bar being intercepted and accelerated by an object such as a stem or a branch. It is very difficult/almost impossible to control and very hazardous.

**Landing**: A cleared area where produce is collected during extraction, processed, piled and prepared for transport to the processing facility or other destination.

**Mechanized felling**: Felling of trees with specialized machines, such as feller bunchers and harvesters.

**Mobile plant**: Any self-propelled mechanical mobile plant designed to move under its own motive power with an operator at its controls and includes wheel and crawler tractors, excavators, skidders, graders and loaders.

**Motor-manual method**: Forest work performed with hand-held machines, most commonly in connection with cutting of trees using chainsaws, but also used for brushcutters and others.

**Operator protective structure (OPS)**: Frames or structures to prevent objects from entering the cab of a machine or vehicle.

**Passline**: A small line threaded through a pulley block at or near the top of a spar to assist the spar climber.

**Prescribed burning**: Preventive use of regulated fire under controlled and favourable conditions, when for instance there is very little wind or a forecast of calm weather, to reduce the quantity of combustible material on the forest floor that would otherwise be a serious fire hazard (also called “controlled burning”).

**Processing**: See Conversion.

**Pruning**: The act of severing branches from a standing tree.

**Roll-over protective structure (ROPS)**: Frames or structures to protect the machine or vehicle operator in the event of overturning.

**Root plate**: The upturned root system of a windblown tree.

**Sappie**: A hand tool consisting of a slightly curved, pointed steel hook mounted on a strong wooden handle 100 to 130 cm long, used for handling and short-distance skidding of logs.

**Skidding**: A harvesting function of pulling a log or tree from the stump to a landing by a skidder.

**Silviculture**: The art, science, and practice of establishing, tending, and reproducing forest stands of desired characteristics. It is based on knowledge of species characteristics and environmental requirements.
**Slash:** Nonmerchantable residue left on the ground after logging, thinning or other forest operations, or after a natural catastrophe.

**Spar:** A tower, mast, tree or A-frame located at the opposite end of the cableway from the yarder.

**Stanchions:** Upright posts or supports for confining logs on trucks, trailers or other vehicles.

**Sulky:** An open framework, mounted on wheels or skids, which is used to suspend the leading ends of logs being extracted manually, with draught animals or with skidding tractors.

**Tending:** A group of maintenance operations to ensure that a tree plantation or young naturally regenerated stands are adequately established and protected up to the production stage – or up to canopy closure.

**Thinning:** A tree removal practice that reduces tree density and competition between trees in a stand.

**Winch:** A rotating powered drum used to haul in or pay out cable.

**Windblown:** Catastrophic damage to standing trees as a result of a gale or storm force wind, with trees being thrown or broken.

**Work positioning system:** Any equipment or structure, other than a temporary work platform, that enables a person to be positioned and safely supported at a location for the duration of the relevant work being carried out.
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In addition to these publications, the Office consulted relevant laws, regulations, directives, guidelines and web pages of a number of ILO Member States and other sources concerning occupational safety and health for the preparation of this code.
Appendix I

Workers’ health surveillance
(adapted from ILO, Technical and Ethical Guidelines for Workers’ Health Surveillance, 1998)

1. General principles

1. Competent authorities should ensure that laws and regulations governing workers’ health surveillance are properly applied.

2. Workers’ health surveillance should be carried out in consultation with workers and/or their representatives:

(a) with the central purpose of the primary prevention of occupational and work-related injuries, ill health and diseases; and

(b) under controlled conditions within an organized framework, as may be prescribed by national laws and regulations and in accordance with the Occupational Health Services Convention (No. 161) and Recommendation (No. 171), 1985, and the ILO Technical and Ethical Guidelines for Workers’ Health Surveillance (1998).

2. Organization

1. The organization of workers’ health surveillance at different levels (national, industry, enterprise) should take into account:

(a) the need for a thorough investigation of all work-related factors and the nature of the occupational hazards and risks in the workplace which may affect workers’ health;

(b) the health requirements of the work and the health status of the working population;

(c) the relevant laws and regulations and the available resources;

(d) the awareness of workers and employers of the functions and purposes of such surveillance; and

(e) the fact that surveillance is not a substitute for monitoring and control of the working environment.

2. In accordance with the needs and available resources, workers’ health surveillance should be carried out at the national, industry, enterprise and/or other appropriate levels. Provided that surveillance is carried out or supervised by qualified occupational health professionals, as prescribed by national laws and regulations, it can be undertaken by:

(a) occupational health services established in a variety of settings, for example within an enterprise or among enterprises;

(b) occupational health consultants;

(c) the occupational and/or public health facilities available in the community where the enterprise is located;

(d) social security institutions;
(e) worker-run centres;
(f) contracted professional institutions or other bodies authorized by the competent authority; or
(g) a combination of any of the above.

3. A comprehensive system of workers' health surveillance should:
   (a) include individual and collective health assessments, occupational injury and disease recording and notification, sentinel event notification, surveys, investigations and inspections;
   (b) comprise the collection of information from various sources, and analysis and evaluation with regard to quality and intended use; and
   (c) determine action and follow-up, including:
      (i) guidance on health policies and OSH programmes; and
      (ii) early warning capabilities so that the competent authority, employers, workers and their representatives, occupational health professionals and research institutions can be alerted to existing or emerging OSH problems.

3. Assessment

   1. Medical examinations and consultations, as the most commonly used means of health assessment of individual workers, either as part of screening programmes or on an as-needed basis, should serve the following purposes:
      (a) the assessment of the health of workers in relation to hazards or risks, giving special attention to workers with specific needs for protection in relation to their health condition;
      (b) detection of pre-clinical and clinical abnormalities at a point when intervention is beneficial to the health of the individual;
      (c) prevention of further deterioration in workers' health;
      (d) evaluation of the effectiveness of control measures in the workplace;
      (e) reinforcement of safe methods of work and health maintenance; and
      (f) assessment of fitness for a particular type of work, with due regard to the adaptation of the workplace to the worker, taking into account individual susceptibility.

   2. Pre-assignment medical examinations, where appropriate, carried out before or shortly after employment or assignment, should:
      (a) collect information which serves as a baseline for future health surveillance; and
      (b) be adapted to the type of work, vocational fitness criteria and workplace hazards.

   3. During employment, medical examinations should take place at periodic intervals, as prescribed by national laws and regulations, and be appropriate to the occupational risks of the enterprise. These examinations should also be repeated:
      (a) on resumption of work after a prolonged absence for health reasons; and
      (b) at the request of the worker, for example, in the case of a change of work and, in particular, a change of work for health reasons.
4. Where persons have been exposed to hazards and, as a consequence, there is a significant risk to their health in the long term, suitable arrangements should be made for post-employment medical surveillance for the purposes of ensuring the early diagnosis and treatment of such diseases.

5. Biological tests and other investigations should be prescribed by national laws and regulations. They should be subject to the worker's informed consent and performed according to the highest professional standards and least possible risk. These tests and investigations should not introduce unnecessary new hazards to the workers.

6. Genetic screening should be prohibited or limited to cases explicitly authorized by national legislation, in accordance with the ILO code of practice on protection of workers’ personal data (1997).

4. **Collection, processing, communication and use of data**

1. Workers’ personal medical data should:

   (a) be collected and stored in conformity with medical confidentiality, in accordance with the ILO code of practice on protection of workers' personal data (1997); and

   (b) be used to protect the health of workers (physical, mental and social well-being) individually and collectively, in accordance with the ILO *Technical and Ethical Guidelines for Workers’ Health Surveillance* (1998).

2. The results and records of workers’ health surveillance should:

   (a) be clearly explained by professional health personnel to the workers concerned or to persons of their choice;

   (b) not be used for unwarranted discrimination, for which there should be recourse in national law and practice;

   (c) be made available, where requested by the competent authority, to any other party agreed by both employers and workers, to prepare appropriate health statistics and epidemiological studies, provided anonymity is maintained, where this may aid in the recognition and control of occupational injuries and diseases; and

   (d) be kept for the time and under the conditions prescribed by national laws and regulations, with appropriate arrangements to ensure that workers’ health surveillance records are securely maintained in the case of establishments that have closed down.
Appendix II

Surveillance of the working environment
(based on the Occupational Health Services Recommendation, 1985 (No. 171))

1. The surveillance of the working environment should include:
   (a) identification and evaluation of the hazards and risks which may affect workers’ safety and health;
   (b) assessment of conditions of occupational hygiene and factors in the organization of work which may give rise to hazards or risks to the safety and health of workers;
   (c) assessment of collective and personal protective equipment;
   (d) assessment where appropriate of exposure of workers to hazardous agents by valid and generally accepted monitoring methods; and
   (e) assessment of control systems designed to eliminate or reduce exposure.

2. Such surveillance should be carried out in liaison with the other technical services of the undertaking and in cooperation with the workers concerned and their representatives in the undertaking and/or the joint safety and health committee, where they exist.

3. In accordance with national law and practice, data resulting from the surveillance of the working environment should be recorded in an appropriate manner and be available to the employer, the workers and their representatives in the undertaking concerned or the joint safety and health committee, where they exist.

4. These data should be used on a confidential basis and solely to provide guidance and advice on measures to improve the working environment and the safety and health of workers.

5. The competent authority should have access to these data. They may only be communicated to others with the agreement of the employer and the workers or their representatives in the undertaking or the joint safety and health committee, where they exist.

6. The surveillance of the working environment should entail such visits by the personnel providing occupational health services as may be necessary to examine factors in the working environment which may affect workers’ health, environmental health conditions at the workplace and working conditions.

7. Without prejudice to the responsibility of each employer for the safety and health of workers in their employment, and with due regard to the necessity for workers to participate in occupational safety and health (OSH) matters, personnel providing occupational health services should have such of the following functions as are adequate and appropriate to the occupational risks of the undertaking:
   (a) carrying out monitoring of workers’ exposure to hazards and risks, when necessary;
   (b) advising on the possible impact on the workers’ health of the use of technologies;
   (c) participating in and advising on the selection of the equipment necessary for the personal protection of the workers against occupational hazards;
(d) collaborating in job analysis and in the study of organization and methods of work with a view to securing a better adaptation of work to the workers;

(e) participating in the analysis of occupational accidents and occupational diseases and in accident prevention programmes; and

(f) supervising sanitary installations and other facilities for the workers, such as drinking water, canteens and living accommodation, when provided by the employer.

8. Personnel providing occupational health services should, after informing the employer, workers and their representatives, where appropriate:

(a) have free access to all workplaces, and to the installations, the undertaking provides for workers;

(b) have access to information concerning the processes, performance standards, products, materials and substances used, or the use of which is envisaged, subject to their preserving the confidentiality of any secret information they may learn which does not affect the safety and health of workers; and

(c) be able to take, for the purpose of analysis, samples of products, materials and substances used or handled.

9. Personnel providing occupational health services should be consulted concerning proposed modifications in work processes or in conditions of work liable to have an effect on the safety or health of workers.