

# International Hazard Datasheets on Occupation



## Civil engineer


### Who is a civil engineer?








A civil engineer plans, designs and directs civil engineering projects, such as roads, railways, airports, bridges, harbours, canals, dams, irrigation systems, pipelines and power-plants. Civil engineers are involved in research, planning, administration, supervision, implementation and project management. They may do work in the following fields: construction; communication engineering; environmental engineering; hydraulics and water resources; soil mechanics; building technology; building administration; etc.





### What is dangerous about this job?

- Falls from elevated surfaces/levels or from ladders; falling into a cellar, shaft, trench or open pit; falling while working on a project site – from cliffs, slopes, into pits, tunnels, etc.
- Injury/death as a result of collapse of an excavation, trench, floor or wall of a building or auxiliary structure; collapse/buckling of components in a structure that is being built; collapse and slide of piles of materials or of stored building equipment; landslides; etc.
- Risk of being hit by heavy mechanical equipment/vehicles working on a sites
- Electrocutation as a result of unintentional contact with “live” electric wires in buildings, during inspection and supervision rounds
- Contact with and exposure to extreme temperatures (during outdoors work, at extreme temperatures, etc.); or cold/frost bites
- Potential exposure to noxious dust while staying at the construction site
- Musculoskeletal system injuries, esp. those stemming from work postures, prolonged driving, etc.

### Hazards related to this job

Specific preventive measures can be seen by clicking on the respective  in the third column of the table.

<b>Accident hazards</b>  	<ul style="list-style-type: none"> <li>• Falls from elevated surfaces/levels (bridges, dams, high floor of a building – veranda/surface without railing, roofs, etc.) or from ladders; falling into a cellar, shaft, trench or open pit; falling while working on a project site – falls from cliffs and slopes, falls into pits, tunnels, etc.</li> </ul>	 
	<ul style="list-style-type: none"> <li>• Slip, trip or fall on the level</li> </ul>	
	<ul style="list-style-type: none"> <li>• Injury/death as a result of collapse of an excavation, trench, floor or wall of a building or of an auxiliary structure; collapse/buckling of components in a structure that is being built; collapse and slide of piles of materials or of stored building equipment; landslides of soil and stones</li> </ul>	
	<ul style="list-style-type: none"> <li>• Injury caused by falling objects, by stepping on sharp objects, and by impact and collision with sharp or protruding objects</li> </ul>	 

	Risk of being hit by heavy mechanical equipment/vehicles working on a site	
	<ul style="list-style-type: none"> <li>Contact with and exposure to extreme temperatures (during outdoors work, at extreme temperatures); or cold/frost bites</li> </ul>	6
	<ul style="list-style-type: none"> <li>Electrocution as a result of unintentional contact with "live" electric wires during inspection and supervision rounds through the construction area</li> </ul>	7
	<ul style="list-style-type: none"> <li>Eye injury, caused by flying splinters/particles of stone and metal, or created throughout demolition and building operations in the area</li> </ul>	4
	<ul style="list-style-type: none"> <li>Injury as a result of a fire and/or explosion of flammable materials at the site (bitumen, tar, solvents)</li> </ul>	
	<ul style="list-style-type: none"> <li>Increased risk of traffic accidents, when working simultaneously on numerous sites, requiring much additional driving</li> </ul>	
<b>Physical hazards</b>	<ul style="list-style-type: none"> <li>Exposure to strong and continuous noise in work areas (emanating from compressors, pneumatic hammers, vibrators, and similar sources)</li> </ul>	
	<ul style="list-style-type: none"> <li>Exposure to various environmental factors, inc. extreme heat or cold, strong solar radiation, heat-load, drying, excessive moisture content, increased or reduced environmental air-pressure, etc.</li> </ul>	8
<b>Chemical hazards</b>	<ul style="list-style-type: none"> <li>Potential hazard of being exposed to noxious dust (such as asbestos dust released during demolition of structures, cement dust, paint-removing chemicals,..) when staying on the work site</li> </ul>	4 6
	<ul style="list-style-type: none"> <li>Dermatitis caused by contact with irritating and allergenic materials (e.g. – cement dust)</li> </ul>	
	<ul style="list-style-type: none"> <li>While visiting the work site an engineer may be exposed to hazards created by other workers – for example: exposure to organic solvents, thinners and paint removers when at the same time a paint job is being performed at the site</li> </ul>	
<b>Biological hazards</b>	<ul style="list-style-type: none"> <li>There are no specific biological hazards, except potential exposure to infectious diseases, like influenza, as a result of close contact with construction workers that contracted such diseases; or development of dermatitis and irritation as a result of drinking polluted water at the site, contact with allergenic vegetation or with insects (inc. wasps and bees), snakes and similar creatures located on the work site.</li> </ul>	
		
<b>Ergonomic, psychosocial and organizational factors</b>	<ul style="list-style-type: none"> <li>Musculoskeletal injuries, esp. those stemming from work posture, from prolonged driving, etc.</li> </ul>	9
	<ul style="list-style-type: none"> <li>Environmental sources of physical and chemical inconvenience and suffering (e.g. – air pollution, bad odours, noxious noise, defective illumination, sick building syndrome, etc.).</li> </ul>	9

## Preventive measures

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- 1 All worksurfaces should be properly installed in order to prevent their collapse/breakage, and to prevent people or objects falling out of them; they as well as all cavities and openings, must be securely fenced; safe and stable positioning of ladders is a must; all open pits, in the field and in the work areas must be safely fenced
  - 2 Wear safety-shoes with non-slip soles; it is also possible to roughen (by various techniques) all or some of the work surfaces
  - 3 All means for preventing worker injury should be applied prior to and during excavation, as well as before carrying out demolition works; compliance with the specific regulations dealing with excavation is a must
  - 4 Use personal protection equipment fit for protecting the whole body, inc. crashhelmets, safety shoes and goggles
  - 5 Work surfaces, floors, footpaths and similar passages will be free from protruding nails, binding wires, and all other obstacles
  - 6 Work clothes have to be fitted to the climatic conditions; in order to prevent dehydration, all workers should drink enough water; use gloves and safety clothes according to need
  - 7 Wear safety shoes that have inherent isolation, and do not work with detective tools
  - 8 Use appropriate clothing and head covers, for protection against inconvenient climatic conditions, inc. solar radiation
  - 9 When necessary, consult with an ergonomist and/or environmental engineer.
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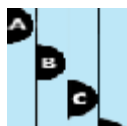
## Specialized information

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**Synonyms** Construction engineer; public works engineer.

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### Definitions and/or description



Plans, designs, and directs civil engineering projects, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation systems, pipelines, and power-plants: Analyzes reports, maps, drawings, blueprints, tests, and aerial photographs on soil composition, terrain, hydrological characteristics, and other topographical and geologic data to plan and design project. Calculates cost and determines feasibility of project based on analysis of collected data, applying knowledge and techniques of engineering, and advanced mathematics. Prepares or directs preparation and modification of reports, specifications, plans, construction schedules, environmental impact studies, and designs for project. Inspects construction site to monitor progress and ensure conformance to engineering plans, specifications, and construction and safety standards. May direct construction and maintenance activities at project site. May use computer-assisted engineering and design software and equipment to prepare engineering and design documents. May be designated according to specialty or product. [DOT].

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### Related and specific occupations

Building-engineer; building-contractor; building/construction foreman; building-inspector; building-supervisor; building-technician; environmental engineer; mason.

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### Tasks

Acquiring; adding; adjusting; advising; analyzing; arranging; boiling; calibrating; classifying; collecting; combusting; comparing; concentrating; connecting; consulting; controlling; copying; cutting; demonstrating; developing; diluting; discussing; dissolving; distributing; drying; evaporating; examination; exercising; exhibiting; extracting; filling; filtering; fixing; following-up;

handling; heating; identifying; injecting; inserting; inspecting; instructing; investigating; invitation; keeping up-to-date; learning; lowering; maintaining; managing; marking; mixing; modeling; monitoring; operating; opening; planning; preparing; processing; pumping; ; measuring; researching; repairing; reporting; sampling; searching; showing; separating; sorting; supervising; supplying; surveying; taking; testing; training; twinning; typing; updating; washing; weighing; writing.

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**Primary equipment used**

Computers and software; drafting, designing and writing equipment; inspecting, measuring and testing equipment; front-wheel drive vehicle.

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**Workplaces where the occupation is common**

Adjusting; administering; analyzing; approving (quality, payments,...); assisting; calculating; climbing; comparing; consulting; coordinating; designing; determining; discussing; drafting; evaluating; examining; explaining; follow-up; guiding; handling; inspecting (design, blueprints, sites,...); instructing; maintaining; measuring; ordering (equipment, materials,...); operating (computer); organizing (the work area); preparing (reports, samples, documents, sketches, plans, ...); reporting; solving (problems – at the site); studying; supervising; surveying; tracing; verifying; writing (reports, worksheets, work orders,...).

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**Notes**



Civil engineers are a keyfactor in the design and realization of projects. They are involved in the investigation, planning, administration, supervision and operation of projects. The civil engineer may be engaged in one or more of the following fields: construction engineering; transportation engineering; soil mechanics; environmental engineering; water resources and use; function and technology of building; building administration; and geodetic engineering.

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**References**



1. Encyclopaedia of Occupational Health and Safety, 4th Ed., ILO, Geneva, 1998.
  2. Encyclopaedia of Occupational Health and Safety, 3rd Ed., ILO, Geneva, 1983.
  3. Occupational Disease - a Guide to their Prevention. DHEW- NIOSH Pub. 77-181,1977.
  4. U.S. Dept. of Labor: Dictionary of Occupational Titles (DOT), 4th. Ed., 1991.
  5. King, R.W. and Hudson, R.: Construction Hazard and Safety Handbook, Butterworth Pub., London, 1985.
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*Updated by VM. Approved by AS. Last update: 20.04.2009.*