

**VIETNAM ASSOCIATION OF
OCCUPATIONAL HEALTH
CENTRE OF OCCUPATIONAL
AND ENVIRONMENTAL
HEALTH**

**INTERNATIONAL LABOUR
ORGANISATION**

**RESEARCH FINDINGS ON THE WORKING
CONDITIONS AND OCCUPATIONAL HEALTH
OF CHILDREN AND ADOLESCENTS ENGAGED
IN WORK IN CARPENTRY, STONE CARVING
AND TRADITIONAL TEXTILE PRODUCTION**

Final report

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FOREWORD

Child labour is a major concern of international organizations and many countries around the world. According to the International Labour Organization (ILO)'s International Programme on the Elimination of Child Labour, considerable differences exist between the many kinds of work children do. Some are difficult and demanding, while others are more hazardous and even morally reprehensible.¹

Vietnam shares the concerns of the international community in regard to this problem. In 2000 and 2003, Vietnam ratified ILO's two most important Conventions: the Convention on the Minimum Age for Admission to Employment (Convention No.138) and the Convention on the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (Convention No.182). In 1995, the Ministry of Labour, Invalids and Social Affairs (MOLISA) and the Ministry of Health (MOH) adopted the "*List of Jobs forbidden to children and adolescents*" (Circular No 09/LB dated 13/4/1995). MOLISA has also signed the Circular "*Stipulating the list of occupations, job and conditions for employing children under 15 years of age*" (Circular No 21/TT-LDTBXH dated 11/9/1999).

Although child labour is a concern, in Vietnam, there is very little data and research on child labour, children's working conditions and the effect of those conditions on children. So far, most occupational health research has focused on adult labour only, and existing occupational health and safety criteria were established specifically for adults.

How do the occupational health and safety hazards present in adult's work effect child labourers? Are the circulars "*List of jobs forbidden to children and adolescents*" and "*Stipulating the list of occupations, job and conditions for employing children under 15 years of age*" reasonable and practical? Finding the answers to these questions will require more research on occupational health and safety issues specific to child labourers, but will be essential to designing appropriate policies and solutions, and to improving community knowledge, attitudes and practices in child care.

This research was undertaken with support and technical assistance from ILO and will serve as one of the first of hopefully many intensive research studies into the occupational health and safety issues and working conditions of child labourers. It is hoped that the results of this research study will inform future revisions to the "*List of jobs forbidden to children and adolescents*" and the "*List of occupations, jobs and conditions for employing children under 15 years of age.*" Moreover, it is hoped that the results of this research study will also make a contribution to community education and to the design of intervention programmes.

The research team welcomes and invites comments from colleagues.

¹ ILO-IPEC. *About Child Labour*. <http://www.ilo.org/ipecc/facts/lang--en/index.htm>

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I. INTRODUCTION

1.1. Background: Study Rationale and Literature Review

1.1.1. Child Labour from a Global Perspective

Child labour is a global phenomenon. It is especially prevalent in developing countries and rural areas. More than 200 million children around the world are engaged in work – for various reasons, but mainly due to poverty ^[source]. In many cases children are major contributors to their family incomes, despite earning a relatively small amount of money from their work.

According to International Programme on the Elimination of Child Labour (IPEC) research, released in April 2002 in *Every child counts: New global estimates on child labour* (Geneva, ILO),^[11] in 2000, worldwide there were some 351.7 million children aged 5 to 17 engaged in some form of economic activity, including 201.8 million in the 5 to 14 year age group. The Asia-Pacific region, with 127.3 million child labourers, has the largest number of child workers in the 5-14 age category. It is followed by Sub-Saharan Africa and Latin America and the Caribbean with 48 million and 17.4 million child labourers, respectively.

Of the 246 million children aged 5 to 17 years who were working as child labourers in 2000:

- 186 million were below the age of 15 and 110 million were below the age of 12.
- 171 million, including 111 million below the age of 15, were working in hazardous situations or conditions.
- Approximately 8.4 million were involved in the ‘unconditionally worst forms of child labour,’ as listed in ILO Convention No.182, Article 3. This included forced and bonded labour (5.7 million), armed conflict (0.3 million), prostitution and pornography (1.8 million), and illicit activities (0.6 million).
- A minimum of 1.2 million were victims of trafficking.
- On average, more boys (132 million) are involved in child labour than girls (113 million) and boys outnumber girls in hazardous work across all age groups. In relative terms, in 2000 nearly three-quarters of boys in child labour (95.7 million) were in hazardous situations, compared with about two-thirds of girls in child labour (74.8 million).

According to ILO’s 2006 *Facts on Child Labour*, in 2005, there were 246 million child labourers worldwide, of whom 73 million were less than 10 years old. Sadly, ILO research also shows that every year 22,000 children die in work-related accidents.^[12]

Evidence shows that some types of work can influence children's physical, mental and psychological development. According to the World Health

Organization, most child labourers work in the informal sector.^[8] Because informal sector work is neither recognized nor protected and/or managed closely, workers (including child labourers) in the informal sector face higher risks than those in formal sectors. Informal economic sectors are present in all fields of manufacturing and are at times closely related to formal sectors.

Even in developed countries, the number of children engaged in informal work is significant. For example, in the United States, 25 – 30% of children are engaged in informal sector work.^[19] Of these, >5% work in mining, 1-2% work in export agriculture and 75% work in household enterprises.^[24] Although the latter may be presumed to offer adequate facilities and oversight, evidence shows that work in household enterprises and/or with family members does carry a risk of exposure to occupational hazards.^[33] Neither the nature of the informal sector work nor the type of enterprise can be isolated as the sole determiner of occupational hazard. Tellingly, a study in the USA showed that more than 50% of work-related deaths in young people in agriculture happened on family farms.^[5]

According to the National Institute of Occupational Safety and Health (NIOSH, USA), it is clear that, despite the existence of numerous gaps in the data, employment-related injuries and illnesses are common among children and adolescents in the United States.^[19] In the USA, adolescents are permitted to work from the age of 16 (or 15, if special permission is obtained) and many choose to do so. Thus, in 1995, an estimated 2.6 million adolescents aged 16 and 17 were employed. Of these adolescents, approximately 70 die each year from injuries at work. Moreover, hundreds are hospitalized and tens of thousands require treatment in hospital emergency rooms.^[17]

Children and adolescents differ greatly from adults, and these differences make them more vulnerable to occupational injury. Young people have less work experience and are in a different stage of physical and psychosocial development. For example, children and adolescents require more sleep, and they generally need to balance their time and efforts between work and study. These differences can lead to accidents as a result of exhaustion, poor judgement and stress.^[17]

Evidence also highlights the increased vulnerability of child labourers to short and long-term health problems as a result of occupational hazards.^[16,27] Work-related health problems are generally not recognized because children are most likely to work in the informal sectors, healthcare staff are not trained to recognise and diagnose occupational health problems in children, and it is very difficult to establish a cause–effect relationship between occupational exposure and health outcomes, especially for health problems with delayed onset and health problems that are difficult to distinguish from non-occupational ones.^[10] Most of the available data on child labour and children's occupational health is from developed countries, particularly the USA. These studies largely focus on rare infections and the health effects of long-term exposure to occupational hazards. These developed country studies are based primarily on secondary data, such as insurance payments to workers and the records of hospital emergency rooms.^[17,18,25] Only a few were conducted at the community level.^[1,14,20] This

could mean that diseases and injuries among child labourers is in fact higher than currently thought.^[2]

Studies from developing countries also address the health of child labourers, but they tend to focus on acute diseases and overlook work-related injuries and health issues.^[18,23,33] Only a few studies have aimed at understanding the relationship between work and health.^[12,26,29]

Studies on environmental health have provided valuable evidence on children's special vulnerability to hazardous working conditions. A broad study in the Philippines, supported by ILO, showed that in 1995, 60% of children engaged in economic activities had been exposed to hazardous conditions in the workplace:

- 19% had been exposed to dangerous biological factors,
- 26% had been exposed to dangerous chemical factors and
- 51% had been exposed to dangerous environmental factors^[20]

In addition, 24% of child labourers suffered from work-related diseases and/or injuries – a much higher prevalence than among adults. The most common types of injury (about 69%) were cuts, chapped skin and scratches. The most common work-related health problems were musculo-skeletal pains (59%) and skin diseases (22%).^[20]

Evidence has also shown that the risk of childhood injury is much higher in children who work, as opposed to those who do not. A 1997 report released by the U.S. Health Statistics Bureau showed that the rate of injury among child labourers in the USA (aged 15 – 17 years) was 4.9 per 100 – significantly higher than the rate of injury among non-child labourers (aged 16 and above), which was only 2.8/100.^[17]

Child and adolescent labourers constitute a particular policy concern, as they are the most vulnerable to workplace abuses, and the most at risk of work-related ill-health problems and injuries. Their physiological and psychological immaturity, as well as their unique and rapid development, leave children more vulnerable to abuse and health risks. Children are known to be more prone to injury through accidents and have been found to be more sensitive to noise, heat, lead, silica toxicity and radiation.^[9,28,34]

Exposure to the pesticides, chemicals, dust and carcinogens that accompany agriculture, mining and manufacturing work increases the risk of developing bronchitis, cancer and other diseases.^[5,10,28] Longitudinal studies in India showed that labourers who began working in the aforementioned industries as children were highly likely to develop tuberculosis and silicosis later on in life. Among these individuals, the rate of silicosis was 35% for stonecutters and 55% for tile makers.^[2]

Ergonomic factors such as lifting heavy loads and remaining in awkward positions for long periods of time can result in musculo-skeletal disorders later in life.^[10,28] Those who have worked since childhood are more prone to suffer from

such chronic diseases, due to their long-term exposure to risk factors as well as to their early entrance to such exposure.^[10]

1.1.2. Child Labour in Vietnam

In Vietnam, children's involvement in income generating activities is not uncommon. An analysis of data from the 2006 Viet Nam Household Living Standards Survey (VHLSS) reveals that in 2006 an estimated 6.7% of children aged 6-14 years (almost 930,000 children) were economically active in 2006. Of these, 296,847 were 12 years of age or less² and 37,139 were less than 10 years old.³ The same analysis also estimates that 503,389 children aged 12-14 were engaged in "non-light" economic activities, despite being below the minimum age for this type of work, and 633,405 children aged 15-17 worked excessive hours. It should be stressed that this is a lower-bound estimate that does not include what ILO defines as the "unconditional worst forms" of child labour, as they are beyond the scope of standard household surveys.⁴

Although few studies have been done on child labour in Vietnam, those that have been carried out do reflect some important aspects of the issue:

First, an investigation into the health and working conditions of child labourers in northern Vietnam showed that children are engaged in a number of hazardous occupations. For example, although it is forbidden, children are still engaged in waste picking/recycling in Nam Son District (Hanoi City). These children come in contact with dangerous pollutants and hazardous chemicals in the course of their work. In Kim Son District (Ninh Binh Province), children working in a sedge mat-making village are exposed to dust, fungi/mould, and chemicals (mainly sulphur and artificial dyes). They must work in awkward postures and from time to time expend significant physical effort. Finally, in Kim Bang District (Ha Nam Province), children working in quarries are required to perform heavy outside labour, are exposed to silicon dust, noise and vibration and are at risk of work-related injury. Although this study suffers from the limitation of a small sample size, its results are still telling. The children who were given a health examination and who answered a survey on disease, health problems and injury showed a high prevalence of such adverse work-related effects as itching, rashes, allergies, sore-throat, respiratory tract inflammation and musculo-skeletal pain.^[21]

Second, a 2006 study funded by ILO in Vietnam gathered information on children who work on boats, in coal collection and as domestic workers. The study found that within these three sectors, the mean age of starting work is less than 15 years of age (the minimum working age in Vietnam, as stipulated by the *Labour Code*).^[30] The study further established that child domestic labour qualifies as one of the "worst forms" of child labour because

- 1) Children start working when they are very young (22.6% of child domestic workers are less than 15 years old);

² i.e. children aged 6-12 years. VHLSS 2006 did not collect information on children below the age of six years.

³ i.e. children aged 6-9 years

⁴ Also children aged 12-14 in light, but hazardous, economic work are not included

- 2) Children have to stop their education in order to work (71.6% drop out of school in order to do housekeeping);
- 3) Children are required to perform monotonous and repetitive work for excessively long hours (43.1% work up to 85 hours per week).

The same study showed that children involved in boating are also exposed to dangerous conditions. Children who work on boats often drop out of school in order to work, and it is common for parents involved in boating to leave their children alone for long periods of time. Child labour on boats qualifies as one of the “worst forms” of child labour because:

- 1) Many child labourers suffer physical abuse – they work more than seven hours per day and in severe weather conditions;
- 2) Boat children suffer neglect and abandonment – in Van Don District children work without adult supervision and children in Phu Vang District stay home alone while their parents are working.

The third group investigated by the 2006 ILO study was children involved in coal collection. These children work in a polluted environment, handle a heavy workload without personal protective equipment and do not have access to periodic health examinations and quality meals. As a result, the work has severe effects on their health. Children who collect coal are highly vulnerable to occupational diseases such as back pain, chest pain, difficulty breathing, tuberculosis, pneumonia and problems of the spinal column. Coal collecting work also prevents children from accessing higher education – either because they do not have time for studying or because they have to stop schooling in order to earn money. Coal collecting can be classified as one of the “worst forms” of child labour because:

- 1) Children suffer severe exhaustion;
- 2) Children are forced to discontinue their education.

1.1.3. Enabling Environment for Child Labour

There are several reasons why child labour exists in Vietnam. Most importantly, children are vulnerable to early labour, as well as the “worst forms” of child labour, because they lack training for other occupations and community members and policy makers are unaware of the issues and dangers surrounding child labour.

An ILO-funded study on career guidance and vocational prospects for people in Vietnam aged 15–17 years showed that most young workers lack the skills and expertise required by the domestic labour market. They have little alternative other than to accept heavy and hazardous work, even when it does not meet regulations on Work Standards and even when they cannot obtain an official work contract. Women labourers are more vulnerable than men, as a result of gender inequality and family/community expectations regarding gender roles and norms. The study recommends increasing career guidance activities and tailoring them to be suitable for specific age groups and specific subjects.^[15]

In Vietnam, children under 14 years of age comprise 25.52% of the population. Adolescents aged 15–19 make up 10.71%. These young people will very soon become Vietnam's main labour force.^[31] As a result, the Government of Vietnam is paying close attention to this segment of the population and is seeking ways to best meet their needs. Vietnam was the first country in Asia and the second country in the world to sign the *International Convention on the Rights of the Child* and is taking steps to harmonise Vietnam's domestic legal framework with its international commitments.

As such, Article 119 of the *Labour Code* stipulates that "it is prohibited for children under 15 years of age to work, except in those jobs defined by the Ministry of Labour, Invalids and Social Affairs" and "it is prohibited to use children in heavy or dangerous occupations and to expose them to hazardous chemicals".^[22] To prevent and protect children and adolescents from being involved in hazardous and dangerous working conditions, and to ensure their comprehensive development and growth, the Government, through the Ministry of Labour, Invalids and Social Affairs and the Ministry of Health, issued Circular No.09/TT-LB on *Defining hazardous Working Conditions and Occupations in which the employment of child labour is prohibited* dated 13 April 1995. A *List of Occupations for which the employment of child workers is prohibited* has been jointly issued and attached to the Circular.^[3]

However, despite the existence of these policies, many children continue to work, especially in the informal sector, in private, small and/or household enterprises and in rural areas. In these types of enterprises, employees, employers and other stakeholders have never been approached by occupational health services and they are aware of neither the law nor the rationale that underpins it.

Thus, for many reasons – such as economic difficulty, few employment prospects, and lack of knowledge and awareness – children continue to work in hazardous conditions.

1.1.4. The Way Forward

Although there have been some studies on child labour in Vietnam, most of these studies have focused on the social aspect of child labour – there is almost no data on working conditions and their effect on children's health, and there is a particular lack of information on children's occupational health.

It is therefore essential to undertake scientific studies to illuminate the real situation of children's working conditions in Vietnam, and the impact of those conditions on health problems, disease, injury and psychological/physiological parameters, in order to encourage policy makers to draft and/or supplement suitable policies to improve working conditions, clean up and protect the environment, reduce occupational risk factors, prevent occupational hazards and protect children's health. This practical step is key to protecting and caring for Vietnam's valuable future work force.

The Bureau for the Protection and Care of Children, underneath the Ministry of Labour, Invalids and Social Affairs (MOLISA), has requested ILO Viet Nam to

assist it in conducting a study on the occupational health and working conditions of children who work in the three most popular handicraft sectors: carpentry, stone carving and traditional textile production.

The handicraft sector, dominated by “handicraft villages”, is growing rapidly in Vietnam. Although handicraft villages have contributed greatly to local economic development, the widespread existence of child labour within them is a particular concern to both policy makers and those involved in occupational health issues.

Vietnam’s traditional handicraft villages – such as those devoted to stone carving, carpentry and traditional textiles – boast a variety of products that are rich in format and design, as well as a dynamic production process. As a result, handicraft villages have contributed considerably to the nation’s economic growth and more importantly, they have created jobs and improved the standard of living in villages, thereby reducing poverty and improving villagers’ quality of life. However, the handicraft villages have also attracted a considerable number of part-time (children who attend school) and full-time (children who do not attend school) child labourers. This is a particular concern because the characteristics of handicraft villages (mainly household enterprises, no official registration of trading, use/employment of children and/or relatives) make them hot spots of child labour.

It is expected that the outcomes of this study will provide solid information to help the Government update and expand the *List of Occupations for which the employment of child workers is prohibited*. Study outcomes will also assist with advocacy, awareness raising and programme development.

The Centre for Occupational and Environmental Health of the Vietnam Association of Occupational and Environmental Health was chosen, based on their qualifications, experience and relevancy, to conduct this study in consultation with the relevant departments of MOLISA and with technical backstopping from ILO-IPEC.

1.2. Goals and Objectives

a/ Goals

The main goals of the study were:

- To provide inputs to advocacy, awareness raising, and the improvement/development of relevant policies and legislation; and
- To provide inputs to future programme interventions.

b/ Objectives

- To provide an overview of the situation of child and adolescent labour in the three focus sectors;
- To assess the working conditions of children and adolescents in the three focus sectors
- To give a primary assessment of the psychological/physiological parameters, diseases and health problems of children and adolescents working in the three focus sectors

1.3. Scope of the study

a/ Overview of the situation of child labour in the three focus sectors

- To describe the tasks and work that children and adolescents (aged 6–17 years) are engaged in
- To ascertain the total weekly working hours that children and adolescents are doing in their respective sector, as well as their involvement in domestic work (i.e. cooking, gathering wood, caring for siblings and other house chores), and the time they spent at school and sleeping

b/ Assessment of the working conditions of child labourers in the three focus sectors (including work characteristics, work process, work environment, etc.)

- Work characteristics: work schedule, working conditions, task assignment
- Working environment: climate (temperature, humidity, air velocity), physical environment (total dust, cotton dust, lighting, noise) and chemical factors (concentration of chemicals resulting from the work process)
- Ergonomic assessment of work spaces and work postures
- Assessment of machinery and equipment safety and personal protective equipment

c/ Primary assessment of psychological and physiological parameters, diseases and health problems of child labourers working in the three focus sectors:

- Diseases and problems

- Psychological and physiological parameters: heart rate, blood pressure, IQ, attention span, short-term memory
- Psychosocial issues such as violence, harassment, threats and isolation of children and adolescents at work

d/ Recommendations for awareness raising and the establishment/improvement of laws and policies; inputs on future programme interventions

- Recommended monitoring system (especially process of supervision and inspection, and responsibilities of specific committees)
- Recommendations to policy makers to consider revising the *List of Occupations for which the employment of child workers is prohibited*, if applicable
- Recommendations on the feasibility of and solutions for reducing or eliminating risk factors for children aged 14–17
- General suggestions for future programme interventions and recommendations for immediate actions to be taken (specific to each target group: youths, parents and employers)

II. SUBJECTS AND METHODOLOGY

2.1. Subjects of the study

According to the United Nations, "children are people under 18 years of age"⁵. According to Article 6 of Vietnam's *Labour Code*, workers are people of at least 15 years of age, having the ability to work and having a work contract.^[20] According to Article 19 of the *Labour Code*, adolescent workers are people under 18 years of age. So, it can be understood that adolescent workers are people from 15 to 17 years of age. This study focused on children and adolescents (aged 6-17 years of age, so called "*children*" for short) who are engaged in any form of work, including full-time or part-time, paid or unpaid, in place of or outside of school, working for enterprises or at home in the three focus sectors: carpentry, stone carving and traditional textiles.

This study also interviewed parents, employers, local authorities and communal healthcare staff in order to provide a range of perspectives.

2.2. Geographical focus

This study was conducted in the provinces where the three focus sectors operate with the help of child labourers. In terms of the scope of the survey, the following villages were selected:

⁵ Office of the United Nations High Commissioner for Human Right, Article 1, Convention on the Rights of the Child, <http://www2.ohchr.org/english/law/crc.htm>

- (i) Carpentry in the Dong Ky Carpentry Village, Tu Son District, Bac Ninh Province
- (ii) Stone carving in the Ninh Van Traditional Stone Carving Village, Hoa Lu District, Ninh Binh Province
- (iii) Traditional textile making in the Hoa Hau Traditional Textile Village, Ly Nhan District, Ha Nam Province

2.3. Sample size and sampling method

Sample for quantitative study

Researchers made a sampling frame from the list of all children and adolescents aged 6–17 who were known to be working in each study site. Based on this frame, simple random sampling was used to select 100 children from each sector.

Sample for qualitative study

Qualitative interviews and focus group discussions were conducted with the target groups: child labourers and their families and employers, local authorities, and local healthcare staff. These groups were singled out because they are in the best position to provide in-depth information about the work, working conditions, and health (presence or absence of disease and injury, etc.) of the child labourers. They are also best placed to make suitable recommendations on advocacy, awareness raising, future programming, and improvements on or development of policies and legislation.

- *Focus group discussions (FGD)*: There were four FGDs per sector with 5-7 people each, including:

- 1 group of child labourers
- 1 group of parents of child labourers
- 1 group of employers of child labourers
- 1 group of local authorities and local healthcare staff

- *In-depth interview*: For each sector, there were 2-3 in-depth interviews with child labourers, parents of child labourers, employers of child labourers and local authorities and healthcare staff.

Sample selection for medical examination and assessment of psychological and physiological measures:

Researchers originally estimated that 30% of the children involved in the quantitative study (approximately a total of 120 children from the three sectors) would be randomly selected to receive a health examination and an assessment of their psychological and physiological measures. However, thanks to the efforts of both the study team and the children themselves, 240 children were able to participate in this portion of the study.

This study also made use of secondary data, reviewing reports and documents related to the objectives and scope of the research.

Criteria for sample selection and exclusion

→ Criteria for sample selection

- Children from 6 to 17 years of age, students or non-students, who were engaged in any form of work (including full-time, part-time, paid, unpaid, in enterprises or in households) in the selected sectors
- Willingness to participate in the study

→ Criteria for exclusion

- Children who were born with developmental disabilities that would have influenced their performance in the psychological and physiological assessment
- Refusal to participate in the study

2.4. Data collection tools

2.4.1. Quantitative study

a/ A structured questionnaire was used to assess child labourers' working conditions, including:

- General information (name, year of birth and level of education)
- Information about working conditions and work environment
- Information about health problems, disease symptoms and work-related injuries
- Information about psychosocial aspects of the workplace

b/ Assessment of health-related factors in the working environment, based on the guidelines of the *Technical Manual of Occupational, Environmental and School Health* (The National Institute of Occupational and Environmental Health, Ministry of Health, 2002).

c/ Assessment of psychological and physiological aspects of the workplace, based on the guidelines of the *Technical Manual of Occupational, Environmental and School Health* (The National Institute of Occupational and Environmental Health, Ministry of Health, 2002).

d/ Health examination

e/ Assessment of respiratory function and hearing, based on the guidelines of the *Technical Manual of Occupational, Environmental and School Health* (The National Institute of Occupational and Environmental Health, Ministry of Health, 2002).

2.4.2. Qualitative study

- Focus group discussions and in-depth interviews with child (6–17 years of age) labourers, parents of child labourers, employers of child labourers and local authorities and healthcare staff.

2.5. Data collection, treatment and analysis

The necessary data for this study was collected using the following tools and techniques:

- Step 1: Selection of the study sites

Based on child labour reports from Vietnam and other countries, and technical advice from ILO, three sectors were selected for this research study: carpentry, stone carving and traditional textiles.

- Step 2: Identification and listing of the study subjects

This step identified and listed children aged 6–17 who were working in the selected sectors. It further selected a sample group to participate in a survey, health examination and assessment of psychological and physiological measures as described above.

- Step 3: Development of data collection tools

Data collection tools were developed based on the researchers' knowledge of and experience with child labourers' working conditions and health issues. After consulting with occupational health specialists, the tools were piloted in the field to check their appropriateness and feasibility. All errors revealed by the field-testing were corrected before the tools were used in the study.

- Step 4: Data collection

a/ Identification of hazards in the child labourers' working conditions and work environment:

- Identification and analysis of workplace hazards:

- + Climate
 - o Temperature
 - o Humidity
 - o Air velocity
- + Environmental factors
 - o Noise
 - o Lighting
 - o Total dust
 - o Cotton dust
- + Chemical hazards

- Measurement of solvent concentration in carpentry village
- Investigation and assessment of working conditions:
 - + Ergonomic assessment of working position, working posture and equipment safety, using *Ergonomic Checkpoints* (ILO, 199).
 - + Investigation of work schedule and characteristics
 - + Investigation of equipment, machinery and work safety
 - + Investigation of the provision and use of personal protective equipment
- b/ Investigation of diseases, injuries and health problems occurring among child labourers*
- Survey (questionnaire) of:
 - + Symptoms related to the health of eyes (including irritation of the mucus membrane), central nervous system and respiratory organs
 - + Work-related injuries and hazards
 - + Musculo-skeletal disorders and related hazards
- Health examination in designated clinics, in line with the Ministry of Health's regulations on health examinations, and with a focus on ENT, eyes, skin and musculo-skeletal symptoms
- Clinical tests on respiration, hearing, heart rate and blood pressure were carried out for those participants diagnosed as symptomatic
- c/ Assessment of workload and assessment of psychological and physiological parameters*
- Assessment of workload and occupational hazards:
 - + Investigation of work characteristics, work intensity, work pace, work volume, work assignment and work norms
 - + Assessment of work-rest schedule using the 'work timing method'
 - + Assessment of working posture using OWAS methods. Assessment of risk of musculo-skeletal disorders using standard questionnaires.
- Assessment of psychological and physiological parameters:
 - + Indicators of physical development (height and weight)
 - + Indicators of cardiovascular health (heart rate and blood pressure, measured before, during and after work)
 - + Energy expenditure during work tasks (extrapolated by calculating recovery pulse rate)
 - + Psychological parameters
 - IQ test
 - Attention test

- Short-term memory test

d/ Focus group discussions and in-depth interviews with child labourers aged 6–17 years, their parents and employers, and local authorities and healthcare staff on issues related to the work and working conditions of child labourers, workplace hazards, the consequences of child labour and recommendations for feasible and appropriate solutions.

Step 7: Data analysis

- Tapes and notes from focus group discussions and in-depth interviews were transcribed for descriptive analysis.

- Quantitative data was collected, edited, entered and analyzed using EXCEL and SPSS 10.0 software.

2.6. Desk review of secondary data

- Data from commune health station records were reviewed to provide general information on the health problems of local people, including children.

- Data from other reports/studies on child labourers and the working conditions and health problems of people living and working in traditional handicraft villages were used to inform the perspective and conclusions of this study.

2.7. Ethical considerations

- All study participants were informed clearly and adequately about the study objectives and content.

- All study participants had the right to decline to participate and to withdraw from the research at any time throughout the study.

- Information collected was used for the study objectives only.

- All personal information concerning study participants was kept confidential throughout the study and will be kept confidential in perpetuity.

- All study participants who were diagnosed with health problems during the clinical examination were informed of their health status and referred to an appropriate healthcare institution for treatment.

- This study was undertaken with the intention of making a significant contribution to the identification of workplace hazards and to the drafting of recommendations for solutions to protect children's health.

2.8. Limitations of the study

First, this study was carried out during the Global Economic Crisis (2008-2009). The challenging economic environment caused the level of production in the target villages to decrease significantly. For example, production in the Dong Ky

Carpentry Village was only 30% of its pre-Crisis level, and the labour force – including children – also decreased, with migrant workers especially affected. The changing economic situation influenced this study: This study could not cover child migrant labourers (although they seem to be more vulnerable); some socio-economic factors were not assessed (such as employer-employee relationships and socio-psychological factors in the workplace) because most of the child labourers who participated were the children or relatives of the employers.

Second, child labour⁶ is a sensitive issue, in part because the concept is quite often misunderstood. Possibly because they feared violating the law, not only employers but also local authorities seemed “to avoid” this topic.

Last, some parents brought their children for a health examination even though the children were not labourers. These children were examined but their data was not used in the study.

III. RESULTS

3.1. Results of field research in the Dong Ky Carpentry Village (Tu Son, Bac Ninh)

Dong Ky is a newly established ward in Dong Quang Commune. In terms of administration, Dong Ky is the capital of Tu Son Town in Bac Ninh Province, and includes seven hamlets. Dong Ky is comprised of 2,955 households – a total of 13,914 people. Dong Ky is conveniently located along a major transportation route. It is near National Highway One and is on the Hanoi – Lang Son, Hanoi – Quang Ninh route. Due to this favourable location, and to Dong Ky’s hard-working, creative and motivated population, the carpentry industry has thrived and Dong Ky's economy has rapidly improved. As a result, the local people now enjoy a relatively high standard of living. The vast majority of the people in Dong Ky are involved in carpentry from a very young age. Most work is done in family groups, though people from neighbouring areas are also employed.

3.1.1. Description of the carpentry process in Dong Ky Village (Tu Son, Bac Ninh)

a/ Wood splitting:

⁶ A term that refers to the state of children (who are under the age of 18) directly or indirectly involved in heavy, hazardous and dangerous work, which is harmful to physical, mental, spiritual, moral and social development of children; or have to work at too young age, which deprives their childhood, opportunities and time necessary for study, recreation and entertainment (ILO).

- Input: Raw material (e.g. trees, big wood blocks) is sawed into boards/pieces using a circular table saw.
- This power saw cuts horizontally and is braced on a table.
- While sawing, two workers stand on either side of the machine and push the saw blade forward. After finishing a line, they pull the saw blade back, set a new mark and saw the next line.

=> Occupational hazards: During this part of the work, occupational hazards include:

- o Heavy workload (lifting/carrying lumber, wooden blocks and wooden work pieces)
- o Saw dust (See Table 2a)
- o High noise levels from the saw (See Table 2a)
- o Risk of injury from the saw blade, other tools and flying debris

b/ Fitting/Assembling:

- Planks and boards (“Hang tho ngang”): Procedure: copy template design onto the timber to be cut => Sketch the lines and edges => Saw according to the lines drawn => Shave and sand the working edges => Measure and cut => Make joints for fitting
- Wood carving (“Hang doc, hang cham”): Procedure: copy template design onto the board/piece => Drill/Carve to make holes and background (chisel 0.5 – 1cm into the background) => Chisel/Carve according to the template design
- Detailed wood carving and finishing (“Hang thung”): Procedure: copy template design onto the board/piece => Drill holes in the work piece => Chisel/Carve in detail, following the template => Sand coarsely (I) => Fit => Sand finely (II) => Polish (by hand, with polish, spray paint or PU spraying)

=> Occupational hazards: During this part of the work, occupational hazards include:

- o Heavy workload (lifting/carrying lumber, wooden blocks and wooden work pieces)
- o Saw dust (See Table 2a)
- o High noise levels (See Table 2a)
- o Exposure to chemicals (e.g. glue, traditional paint, paint, polish, solvents)
- o Risk of injury from sharp tools and equipment (e.g. saws, chisels) and flying debris

c/ Inlaying with mother-of-pearl (“Kham xa cu”):

This process is similar to the processes described above.

- Procedure: Cut mother-of pearl (snail/oyster skin) according to the template, using a special saw => Chisel out the background, according to the template (carve 0.3 – 0.5cm into the product) => Adhere mother-of-pearl pieces onto the background using glue or a traditional paint => Polish finished product with a spray polish

=> *Occupational hazards:* During this part of the work, occupational hazards include:

- o Heavy workload (lifting/carrying lumber, wooden blocks and wooden work pieces)
- o Saw dust (See Table 2a)
- o High noise levels (See Table 2a)
- o Chemicals (e.g. glue, traditional paint, paint, spray polish, solvents)
- o Risk of injury from sharp tools and equipment (e.g. saws, chisels)

3.1.2. Children’s involvement in the manufacturing process

In the three main carpentry processes described above, children in Dong Ky Village tend to work mostly in sanding and mother-of-pearl inlay – jobs that are considered “light tasks.” Other tasks, such as sawing, drilling, chiselling and, in particular, spray polishing, are usually carried out by experienced workers who possess the necessary strength and skills to do so.

On the days that the research team visited, no children were found to be doing “heavy tasks.” Nevertheless, most of the experienced workers reported that they had become skilled in “heavy tasks” by learning and practising from a very young age (about 14-15 years old). As they explained, young children’s hands are more “flexible and dexterous”, thus quicker to learn detailed work.

In Dong Ky Village, most household enterprises have a crowded workshop without clear divisions between work sections. Children work alongside adults. Therefore, although they may not work directly on “heavy tasks”, most children involved in carpentry are exposed to occupational hazards.

In Dong Ky Village, children have varied working arrangements. Depending on the children’s age, ability and condition they may work full-time or part-time, be paid or unpaid (usually the case for household/family enterprises), or may be learning a craft or providing assistance to a craftsman.. As a result, the time child labourers spend working varies widely:

+ Full-time work (paid or unpaid): In most cases, children begin full-time work from the age of 15 and leave school after the 9th grade. When working full-time they usually spend from 7–8 hours and up to ten hours a day at the workplace.

+ Part-time work (paid or unpaid): Younger children who are still in school usually work part-time. After school hours they work at home, for their parents in household enterprises, or in other neighbourhood workshops. They generally perform “light tasks” that require less skill and physical force. Such light tasks are considered the “beginning” or learning stage of carpentry work.

The following are some examples of a typical daily schedule, taken from a focus group discussion with child labourers in Dong Ky Village:

Daily diary:

I have stopped going to school.

I have been working since I was 15 years old and now that I am a main worker (“tho ca”) I am involved in all stages of production.

I work at home, helping my parents in their carpentry workshop, and I also work for another owner in the evening.

I work 7–8 hours per day on average. My income from my evening job is 30,000VND for three hours. I work to help my parents, to learn and to carry on our carpentry tradition. I work because I love this work and I like doing it.

Yesterday Daily Diary:

I have a regular daily activity for everyday life.

In the morning, I wake up at 6:30, brush my teeth and have breakfast. I work from 7:30 until 12:00, when I have lunch. After lunch, I take a short nap until 14:30. In the afternoon, I work from 14:30 to 18:00, and then I get some exercise. Every day is the same, except for when I have a special task, like taking products to a customer, or when I am sick.

If I had another hour every day, I would spend that hour on relaxing and playing sports...because I feel like I don’t have enough time for sports...My job occupies most of my time.

*Male, 17 years old, full-time work
Dong Ky Village*

Daily diary:

This year I am going to study in grade 6.

I started doing carpentry when I was in grade 5.

On average, I work 1–2 hours a day.

I do wood scraping. I work in order to help my parents. I love my scraping work very much.

Yesterday Daily Diary:

- I got up at 6:00

- I brushed my teeth, washed my face and had breakfast until 6:30
 - At 7:00 I worked for my parents
 - At 9:30 I stopped working to go to prepare lunch
 - At 11:30 my family finished lunch
 - I took a snap to 13:30, I got up and helped my parents in scraping wood
 - At 19:30 I stopped working to help my parents to prepare dinner
 - At 21:00 I went out with my friends
- If I had one more hour a day, I would spend on watching TV.

*Female, 11 years old, part-time work
Dong Ky Village*

3.1.3. Working conditions in Dong Ky

3.1.3.1. Work environment in Dong Ky

a/ Climate

Table 1. Climate in carpentry workshops in Dong Ky

No	Workplace	Temperature (°C)	Humidity (%)	Air velocity (m/s)
	Outside	29.8 - 33.1	69.5 - 90.4	0.85 - 1.86
1	Planing/Shaving machine	28.7- 30.7	69.4 - 75.9	0.79 - 1.98
2	Splitting machine	29.0	76.4	1.46
3	Saw	30.8	68.3	2.43
4	Drill	30.4	67.7	1.82
5	Joint carving (“Duc mong”)	30.7	67.5	2.07
6	Joint fitting (“Ghep mong”)	29.3	75.5	3.01
7	Preparation of carving (“Lay nen”)	28.1	82.7	1.89
8	Wet sanding	28.4	85.5	1.07
9	Dry sanding	28.6 - 32.0	71.6 - 82.1	1.08 - 2.54
10	Machine sanding	31.0	66.8	2.83
11	Blowing machine	30.4	72.8	3.78

12	Wood scraping (“Nao go”)	30.8 - 32.5	68.4 - 72.1	1.05 - 1.54
13	Paint preparation (“Pha son”)	32.6	69.4	1.03
14	Spray painting (“Phun son”)	32.4	67.3	1.19
15	Spray polishing (“Phun bong”)	32.8	68.8	1.00
16	Polish preparation (by hand) (“Danh vec-ni”)	29.8	73.3	0.63
17	Gluing (repairs) (“Va hang loi bang keo”)	30.5	72.3	2.15
18	Carving	30.5	65.7	1.66
19	Inlaying with mother-of-pearl (“Kham xa cu”)	28.5	76.5	2.22
	Maximum allowable limits (Permitted Hygiene Standards, MOH, 2002)	≤32	75 - 85	<2

In Dong Ky Village, children work mainly inside the workshop, where the temperature is usually a bit lower than that it is outside. Nevertheless, because most workshops are very simple, rudimentary and cramped, the temperature is still very high, especially in summer. Temperatures taken in the areas of the workshops where children were more likely to be (areas for dry sanding, wood scraping, etc.) were higher than in other places.

According to the Permitted Hygiene Standards (issued through Decision No.3733 10/10/2002 of the MOH), workplace temperatures must not exceed 32°C, in areas where light work is done, and 30°C in areas where heavy work is done. Even though the sanding area where children work was within the safety limits when measured by the research team, this does not necessarily mean it was indeed safe. Sanding is considered light work, in that it doesn't require great physical force. However, work safety standards and designations of work as “light” or “heavy” are made for adults, not children. There are no standards for child or adolescent labourers. In fact, many tasks that are considered “light” for adults may be “medium” or even “heavy” for children and adolescents. Therefore, application of adults' permitted hygiene standards to children and adolescents is not appropriate.

The most common solutions for climate control in Dong Ky workshops are natural ventilation and fans. However, natural ventilation is very limited because the workshops are so cramped. Fans are also problematic because workshops are very dusty and fans disperse that dust to all workplaces.

In some workspaces where children worked, researchers measured an air velocity of over 2m/s – in violation of the Vietnamese Permitted Hygiene Standards, which require that air velocity in the workplace does not exceed 2.0m/s. Some research has recommended that air velocity in the workplace should not exceed 1.5m/s because higher than that and it has adverse effects on the body.

In Dong Ky Village, none of the interviewed children were found in painting and paint preparation work, but in some workshops their workspaces were very close to painting and paint preparation areas, especially in small workshops. This is a hazard to children’s health, particularly in summer when high temperatures exacerbate the evaporation of paint and hazardous solvents. Researchers found that some workshops are trying to isolate painting and paint preparation areas from other areas. This is a very encouraging development.

b/ Environmental factors

Table 2. Environmental factors of carpentry workshops in Dong Ky

No	Workplace	Lighting (lux)	Noise (dBA)	Total dust (mg/m ³)
	Outside	270 - 1120	57.8 - 80.2	0.118- 0.410
1	Planing/Shaving machine	225 - 490	83.7 - 86.7	1.305 - 1.955
2	Wood splitting machine	575	87.5	1.951
3	Saw	210	87.2	1.741
4	Drill	220	83.7	1.247
5	Joint carving	350	82.2	0.575
6	Joints fitting	350	76.5	0.540
7	Making “background”	470	86.6	1.90
8	Wet sanding	520 - 885	64.9	0.38
9	Dry sanding	520 - 885	65.7 - 73.4	0.835 -2.51
10	Machine shaving/polishing	450	84.6	2.310
11	Blowing machine	1575	75.7	8.455
12	Wood scraping	265 - 2050	63.7- 76.3	0.654 - 0.918
13	Paint preparation	315	70.2	1.301
14	Spray painting	210	77.8	0.911

15	Spray polishing	200	76.5	0.834
16	Hand polishing	1735	69.1	0.812
17	Gluing (repairs)	770	64.1	0.580
18	Carving	220	80.9	0.712
19	Inlaying with mother-of-pearl	590	71.4	0.83
	Maximum allowable limits (Permitted Hygiene Standards, MOH, 2002)	150 – 500	≤85	6.0

- Lighting

Most of the carpentry workshops in Dong Ky Village took advantage of natural lighting, especially in the summer time (when the study took place), so illumination varied widely.

According to the Permitted Hygiene Standards, the required lighting for carpentry workshops is 150–500 lux. Because sanding, the type of work that children are most involved in, is not highly demanding on the eyes, 580 – 855 lux is acceptable. Creating mother-of-pearl inlay is more visually demanding, but here also the lighting was adequate (590 lux).

- Noise

Researchers recorded the highest noise levels at the saw, the planing/shaving machine, and in the areas where the “background” was made.

It should be noted that this study took place during the low production period that followed the Global Economic Crisis. Manufacturing and processing activities – and hence work activity and the ensuing noise – were much decreased.

The highest noise levels recorded were only 1.6–2.2 dBA over the Vietnamese Permitted Hygiene Standards and no children or adolescents were reported to work in those areas. That does not, however, necessarily mean that child labourers are safe from work-related hazards. First of all, workshops are so cramped that all work areas, as well as the surrounding community, are affected by the noise. Second, there is some discrepancy in setting maximum limits on noise pollution; Vietnam sets its maximum at ≤85dBA but a number of other countries set it at ≤80dBA.

- Dust

The sawdust present in Dong Ky carpentry workshops can cause allergies in those exposed to it.

The Permitted Hygiene Standards for dust is 6 mg/m³. Dust levels in most of the Dong Ky workspaces were within the permitted limit when measured, the one

exception being in the area around the blowing machine. Most critically, however, of all the workspaces in Dong Ky assessed by researchers, the highest concentrations of dust were in those areas where child labourers are most involved. For example, the dust concentration in sanding areas was 0.835-2.51mg/m³.

Similar to noise, most workshops are in residential areas or even right inside people's homes, therefore dust and other pollution from the work environment has a huge effect on people's living environment. Children may be affected by hazardous conditions not only within working hours, but outside them as well.

c/ Chemical factors

Table 3. Concentration of solvents in carpentry workshops in Dong Ky

N ^o	Solvent	Workplace			Permitted level (mg/m ³)
		Entrance/ spray painting area)	Back of workshop (near hood)	Centre of workshop (no spraying)	
1	Tricloetan	0.053	0.044	0.020	-
2	Benzen	4.212	2.044	1.233	15
3	Dicloetan	0.095	0.050	0.019	8
4	Toluen	66.4	55.92	17.808	300
5	Xylen	4.222	14.60	7.133	300

The greatest chemical hazard in carpentry villages is organic solvents.

Table 3 shows that although the concentration of each solvent in the air did not exceed the Permitted Hygiene Standards the number of solvents present in the work environment is quite large. Researchers found that, the concentration of solvents was high even when not spray painting.

Researchers did not find children or adolescents involved in painting, because painting requires higher skills. Nevertheless, because workspaces are cramped, overlap and are located in residential areas, children are affected.

Table 4. Air quality of the surrounding environment

N ^o	Solvent	Recorded level (mg/m ³)	Permitted level
1	SO ₂	0.045 – 3.11	40
2	Toluene	0.02 – 0.1	0.6

3	Xylene	0.005 – 0.01	-
4	Petroleum vapour	0.012 – 1.24	5
5	Benzene	0.02 – 0.15	1.5

Table 4 shows that work-related chemicals pollute the environment surrounding the carpentry village. Although this pollution exists in small quantities, it is caused by many different solvents and has persisted and accumulated for many years so it may cause a series of adverse health effects on both workers and the community. From the occupational health point of view, even a factor “under the permitted value” is not necessarily safe.

3.1.3.2. Assessment of working conditions in Dong Ky

Table 5. Children’s subjective assessment of their work environment in Dong Ky

No	Factors at workplace	Percent of children that complained (%)		
		Full-time workers	Part-time workers	Total
1	Dust	100.0	92.0	93.7
2	Noise	100.0	89.3	91.7
3	Bad smell	95.2	31.4	46.1
4	Heat	85.7	39.7	50.0
	<i>Total</i>	21	73	105

Although the concentration of dust in the workplace did not exceed permitted values when measured by researchers, children complained most about dust (93.7%). Their second greatest complaint was noise (91.7%). Altogether, 100% of full-time child labourers complained about dust and noise in the workplace.

Likewise, researchers did not find temperatures in the workplace to exceed the permitted value for adult workers, nevertheless many children complained about the heat (85.7%). This highlights the need for Maximum allowable limits adjusted for children and adolescents.

Children who worked full-time were more likely to complain about the heat and bad smells. (85.7 and 95.2 for full-time workers, compared to 39.7 and 31.1 for part-time). This difference can probably be explained by differences in the two groups’ working environment. Children who work full-time must work

continuously in the same place for long periods of time, whereas part-time workers work less and carry out more varied tasks.

Table 6. Children’s subjective assessment of their working conditions in Dong Ky

No	Factor at workplace	Percent of children that complained (%)		
		Full-time workers	Part-time workers	Total
1	Awkward postures	95.0	29.6	44.0
2	Risk of injury	90.5	35.8	47.9
3	Carrying heavy loads	87.5	25.9	40.2
4	Psychological stress	60.1	21.8	31.1
	<i>Total</i>	21	75	102

In terms of working conditions, among the interviewees who worked full-time, 95% of complained of awkward postures, 90.5% said that there was a risk of injury in their workplace and 87.5% said that they sometimes carried heavy loads. These rates were much lower in the group of part-time workers, which can be explained by the latter having less exposure to work.

Focus group discussions with employers and the parents of child labourers showed that injuries resulting from knocking/striking against lumber and equipment, and cuts and scratches and other bodily harm are common among child labourers. The main cause of injury mentioned by participants was the unergonomic/disorderly arrangement of materials and equipment. Participants said that most injuries were not recorded because the injured children did not go to the Commune Health Station.

“Cuts on hands or feet/legs are common, but they don’t need the Commune Health Station. They treat those injuries by themselves – by binding the wound. If they go to the Health Station, they only ask for some medicine or bandage and then come back to work”

(In-depth interview, health care staff in Dong Ky)

3.1.4. Assessment of work load and psychological and physiological parameters of child labourers in Dong Ky

3.1.4.1. Results of field observation in Dong Ky

In order to have real data on children's work load, field observations were carried out in the two work areas where child labourers work the most: sanding and inlaying with mother-of-pearl.

- Sanding: This task is mostly done in a seated position – in small chairs or squatting – or bent over, and movements are repetitive.
- Observations of five children aged 14-17 doing sanding work showed that:
 - + Movement frequency per minute: 110 strokes per minute on average (95 – 120). This showed that this task is highly monotonous and repetitive.
 - + The average recovery heart rate after work was 85 beats per minute. The highest heart rate observed at work was 90 times per minute.

At present, Vietnam has no established standard to assess the workload of child labourers. According to the “*System of working conditions criteria*” of the Ministry of Labour, Invalids and Social Affairs, issued together with Decision No.2753/LD-TB-XH on August 1st, 1995, “*Work that has the average heart rate, calculated from the average of the whole group throughout the whole of the work-shift, of 81 – 85 beats per minute is ranked as 3rd tier heavy work.*”

The child labourers’ recovery heart rates of 90 beats per minute showed that there was strain on their cardiovascular system.

3.1.4.2. Psychological assessment of child labourers in Dong Ky

a/ Short-term memory test

Table 7. Results of short-term memory test by age in Dong Ky

Age	Number of Test-takers	Mean Score	Standard Deviation (SD)
≤12	1	2.0	0
13	14	3.4	0.94
14	6	4.2	1.47
15	13	3.2	1.48
16	13	3.6	1.39
17	8	3.1	0.99
<i>Total</i>	55	3.4	1.26

Table 7 shows that child labourers’ mean scores on the short-term memory test (Figure-Memory Test) varied according to age but, except for the case of a child less than 12 years old, the difference between the mean scores was not significant. Compared to the results of another study in children 12 – 15 years old

in Hung Yen province,^[6] children in Dong Ky scored lower on the short-term memory test .

b/ Attention test (Landolt test)

Table 8. Results of test on ability to follow instructions by age in Dong Ky

Parameter	Age group		
	<15	≥15	Total
Number of Test-takers	22	38	60
Mean	0.73	0.72	0.73
SD	0.16	0.15	0.15
Min	0.31	0.35	0.31
Max	1.00	1.00	1.00

Table 8 shows that the ability of child labourers in Dong Ky to implement tasks accurately was 0.72 – 0.73. There was no significant difference between the under 15 group and the older group.

Table 9. Results of test on work efficiency by age in Dong Ky

Parameter	Age group		
	<15	≥15	Total
Number of Test-takers	22	38	60
Mean	201.87	247.69	230.89
SD	51.90	70.48	67.60
Min	115.14	133.55	115.14
Max	285.53	438.29	438.29

In terms of work efficiency, measured by the Landolt test, the mean scores of children ≥15 was higher than that of children <15 years old (247.69 ± 51.90 compared to 201.87 ± 70.48). This means that children ≥15 have better work efficiency than children <15 years old. However, this difference was not statistically significant (p>0.05).

c/ IQ test (Raven test)

Table 10. Results of Raven test by age in Dong Ky

Age	Number of test-takers	Mean Scores	Standard Deviation (SD)
≤12	1	33.0	-
13	13	34.8	6.82
14	7	35.3	10.53
15	12	36.8	5.91
16	13	38.8	12.33
17	9	33.4	14.40
<i>Total</i>	55	36.0	9.90

The Raven test was used to assess child labourers' ability to think systematically, use logic and find the connection between phenomena.

The standard scores should increase by age. The median standard scores (or referred scores) by age are as follows (referred by raw scores of 1.400 children, MOET, 1992^[3]):

12 years old: 39

13 years old: 43

14 years old: 44

The test results of children in Dong Ky Village showed that from age 12–16, the mean scores increased slightly by age and ranked in under 50% (below the median). The raw mean scores of children aged 12–15 in Dong Ky were lower than that of children of the same age in Hung Yen province.^[6]

3.1.5. Diseases and health problems among child labourers in Dong Ky

3.1.5.1. Self-reported symptoms and health problems in Dong Ky

Table 11. Children's self-reported symptoms and health problems in Dong Ky (within past 12 months)

No	Symptom	Percent of children who reported the symptom (%)		
		Full-time workers	Part-time workers	Total
1	Cough	72.3	63.3	65.4

2	Musculo-skeletal pain	47.6	65.1	61.3
3	Sore throat	45.9	37.0	39.0
4	Headache	45.7	36.0	38.3
	<i>Total</i>	21	75	102

Of the symptoms that child labourers reported experiencing over the previous 12 months, the most frequent were cough and sore throat. This could be related to their exposure to high levels of dust – a situation that future research should examine in greater depth.

The rate of musculo-skeletal pains was 60%, higher among part-time workers (65.1%) than among full-time workers (47.6%). It should be kept in mind that these symptoms were self-reported, and musculo-skeletal pain in children is usually temporary. However, because children are in the process of development, awkward postures could make adverse impacts on the development of their musculo-skeletal system.

3.1.5.2. Results of health examination of child labourers in Dong Ky

Table 12. Results of health examination of child labourers in Dong Ky

No	Disease	Percent of children diagnosed with disease (%)
1	Tonsillitis	17.4
2	Reflection defect	16.2
3	Itching and rash	10.8
4	Conjunctivitis	8.1
5	Pharyngitis	2.9
6	Inflammation/infection of the middle ear	1.4
7	Blepharitis	1.4
	<i>Total</i>	73

The results of medical exams done on child labourers in Dong Ky showed Tonsillitis to be the most common disease, with 17.4% of the children testing positive, followed by Reflection defect at 16.2%, and itching and rash at 10.8%.

The rate of Reflection defect among child labourers in Dong Ky was similar to that of children living in other rural areas in Vietnam. The high rate of upper respiratory track infection corresponds with the disease model for individuals exposed to high concentrations of dust for long periods of time.

3.1.5.3. Results of respiratory test of child labourers in Dong Ky

Table 13. Results of respiratory test of child labourers in Dong Ky

No	Respiratory diagnosis	Number with diagnosis	Percent with diagnosis (%)
1	Normal	51	68.9
2	Restrictive syndrome	22	29.7
3	Obstructive syndrome	1	1.4
	<i>Total</i>	74	100

Respiratory test results for 74 children in Dong Ky showed that 22 children had restrictive syndrome (29.7%) and one child had obstructive syndrome. A definitive conclusion about the relationship between respiratory health and working conditions is beyond the scope of this survey. However, evidence from the medical literature shows that saw dust and solvents are possible allergens. Attention should be paid to this in future studies.

3.1.5.4. Results of hearing test of child labourers in Dong Ky

The results of a hearing test (air-track test) showed that almost 40% of the children have slight hearing loss at 1000Hz and 15% have it at 400Hz. These children should have access to more in-depth examinations and follow-up to determine the cause of their hearing loss and receive accurate and timely treatment.

Occupational hearing loss is one of the most important concerns when workers are exposed to noise in the workplace. According to L. Trung (1997), occupational hearing loss accounts for 10% of all compensated occupational diseases in Vietnam.

Key symptoms of occupational hearing loss are:

- + Symmetrical hearing loss in both ears
- + V-shaped audiogram with a drop-point of 4000Hz or lower
- + Linings of the air-track and bone-track almost coincide (due to inner ear damage that manifests as radio relay hearing loss)

To illustrate, the results of the hearing test (bone-track test) performed on 73 child labourers in Dong Ky is presented in Table 14, below.

Table 14. Results of audiometric assessment of children in Dong Ky (bone-track test)

No	Frequency (Hz)	Number of cases			
		One ear		Two ears	
	Level of hearing loss	Light	Medium	Light	Medium
1	500	20	-	18	-
2	1000	5	-	3	-
3	2000	14	-	21	-
4	4000	-	-	1	1
5	8000	-	-	-	1
	<i>Total</i>	73			

The results of the bone-track hearing test, presented in Table 14, show that hearing loss among the 73 child labourers was fairly high, especially at frequencies of 500Hz and 2000Hz, although in most cases the damage was light. Among children diagnosed with hearing loss, 14 had reduced hearing at least at two frequencies (mostly at 500Hz and 2000Hz). There were eight cases of hearing loss in one ear at a frequency of 500Hz, but otherwise hearing loss was in both ears and at higher frequencies. Compared to the two other focus sectors assessed by the research group, noise pollution in Dong Ky was not the worst, yet the number of children suffering from hearing loss in Dong Ky was higher. This contradiction may be explained by differences in exposure to other hazards, such as solvents, – but unfortunately, the limits of this study prevented researchers from doing further analysis on the topic. Ideally, future research studies will take this matter into account.

The literature review showed that there are many causes of hearing loss in children. In this study, otorhinolaryngologists (experts of the ear, nose and throat) examined the children and found only one case of inner ear inflammation and one case of outer ear inflammation. This raised the following questions:

- + When did these children acquire their hearing loss?
- + What is their exposure history?
- + What is the exposure history and hearing condition of their parents?

From an occupational health point of view, work-related exposure to noise and solvents could be to blame. More study and follow up is needed to understand the situation and ensure the children have access to timely and appropriate treatment.

3.2. Results of field research in the Ninh Van Stone carving Village (Hoa Lu, Ninh Binh)

Ninh Van Village is a commune located in a northern mountainous area, about 20km from the centre of Hoa Lu District. Ninh Van is about 1,264.6ha and is divided into 13 hamlets. Approximately 9,763 people (4,642 males and 5,121 females) live there, including about 2,600 children less than 18 years of age and 729 children under the age of five.

People in Ninh Van live mainly by agriculture and traditional stone carving, a profession whose history stretches back more than 100 years. In 2004, the Government of Vietnam recognized five area villages as traditional stone carving villages and allowed the commune to build a 25ha park for Ninh Van. Other professions in Ninh Van include embroidery and rock extraction. The Health Station of Ninh Van is located in the centre of the commune and is no more than two kilometres from any of the 13 hamlets.

At the time of this study, approximately 1,000 people worked in stone carving, five villages were recognized as traditional stone carving villages and there were 35 stone carving enterprises and 453 stone carving household businesses.

3.2.1. Description of the stone carving process in Ninh Van

a/ Rock extraction

- At the quarry => extract stones by dynamiting large blocks => Split large blocks into smaller ones using traditional methods (drilling holes and using crams) => Transport to workshops
- At the workshops => Split stones into slides/blocks of the required dimensions, using a cutting machine

=> *Occupational hazards:* In this part of the work, occupational hazards include:

- o Heavy workload (lifting/carrying stones)
- o Stone dust (which may include silica, a cause of silicosis)
- o High noise levels, particularly during extraction
- o Heat, particularly in summer
- o Risk of injury from sharp tools and equipment (e.g. saws and chisels), sharp stones, heavy stones, falling stones and dynamite

b/ Stone carving at household/private workshops

There are two main kinds of traditional stone products: statues/stamps and drawings/pictures. They are made by:

- Stone statues/stamps: Split stones into boards/blocks => Measure and determine the dimensions of the statue/stamp, according to the template

=> Sculpt/Carve according to the template => Rough grind/polish (by hand and with a grinding machine) => Fine polish

- Stone drawings/pictures: Split stones into slides of different sizes => Cover the stone slide with traditional black paint => Copy the template onto the paint-covered surface using a small chisel => Carve the stone surface according to the template => Polish

=> *Occupational hazards*: In this part of the work, occupational hazards include:

- o Heavy workload (lifting/carrying stones)
- o Stone dust, potentially with silica
- o High noise levels
- o Heat, particularly in summer
- o Risk of injury from sharp tools and equipment (e.g. saws and chisels), sharp stones, heavy stones and falling stones

3.2.2. Child labour in stone carving

Of the processes described above, children (both boys and girls) are most often involved in making stone drawings/pictures. This is considered a “light task.” According to their employers, even six year-old children can do this task, which is considered the “starting task” of a stone carver in Ninh Van.

In stone statue/stamp making, most tasks (such as splitting with a cutting machine, drilling and chiselling) are carried out by experienced workers who possess the necessary strength and skill. In these workshops, researchers found only a few children (mainly males) aged 16-17 years old cutting and polishing stones.

Similar to Dong Ky Village, most household workshops in Ninh Van Village are rather cramped and there is no clear separation between workspaces. Therefore, although they may not work directly on “heavy tasks,” most child labourers are exposed to occupational hazards because they work in the same place as adults.

In focus group discussions with child labourers in Ninh Van Village, researchers only found children working part-time, after school.

Daily diary:

Morning:

- Get up at 6:30
- Wash face, brushing teeth
- Having breakfast at home
- Go to school (review for the exam)
- 10:00: Come back home

- Have lunch, have a snap

Afternoon:

- 14:30: Getting up
- Playing to 15:30
- Go to stone workshop, chop stone until 17:00, come back home to cook rice
- Have a bath and have dinner

Evening:

Study

Male, 15 years old, part-time work

Ninh Van Village

Daily diary:

- 5:30: Get up
- 5:30 – 6:00: Wash face, brush teeth
- 6:30: Have breakfast at home
- 7:00: Go to school (summer study)
- 10:00: Come back home
- 10:15 – 11:30: Go to the market to buy food and prepare for lunch
- 12:00: Have lunch, then wash dishes
- 12:00 – 13:00: Relax
- 13:00 – 14:00: Have a nap
- 14:15 – 16:30: Carve stone pictures
- 16:45 – 17:30: Prepare for dinner
- 18:00: Have dinner
- 19:00: Have a bath, then study

Female, 14 years old, part-time work

Ninh Van Village

3.2.3. Working conditions in stone carving workshops in Ninh Van

3.2.3.1. Work environment in Ninh Van

a/ Climate

Table 15. Climate in stone carving workshops in Ninh Van

No	Workplace	Temperature (°C)	Humidity (%)	Air velocity (m/s)
	Outside	35.0 - 36.7	65.9 - 67.9	1.10 - 1.76
1	Splitting stone for statues	32.6	64.7	0.96
2	Splitting stone for stone pillars	34.7	61.3	0.84
3	Splitting white stone for statues	33.8	68.3	1.61
4	Cutting stone by hand-held stone cutting machine	34.6	66.9	1.92
5	Dry grinding	34.2 -34.6	68.2 - 68.4	1.43 - 1.58
6	Wet grinding	33.9	74.5	1.36
7	Plastering stone (“tret da”)	34.9	63.0	3.38
8	Splitting stone with splitting machine	34.5 - 34.9	62.4 - 66.6	1.96 - 2.45
9	Gluing/sticking stone	35.2	67.2	0.32
10	Making stone backgrounds	34.1 - 33.4	65.8 - 66.4	0.79 - 1.34
11	Rough carving	35.8	67.9	1.90
12	Chopping stone	35.6	65.8	1.85
	Maximum allowable limits (The Permitted Hygiene Standards, MOH, 2002)	≤32	≤80	<2

The greatest climate concern in Ninh Van Village was the temperature. This study took place in the summertime so the temperature in stone carving workplaces was rather high. Most of the temperatures sampled were 2.6-3.8°C higher than the Vietnamese Permitted Hygiene Standards (MOH, 2002).

According to N.N.Nga, N.V.Hoai et al, at 35°C one’s working capacity decreases by 18% compared to that at 25°C. Besides, studies from the NIOEH show that to replenish water and salts, potassium is essential for those working in high temperatures.

b/ Environmental factors in Ninh Van workshops

Table 16. Environmental factors in Ninh Van stone carving workshops

No	Workplace	Lighting (lux)	Noise (dBA)	Total dust (mg/m ³)
	Outside	-	65.9 - 71.8	1.26 - 1.98
1	Splitting stones into stone statues/pillars	-	97.7 - 103.6	2.95 - 4.15
2	Hand-held stone cutting machine	-	95.7	4.18
3	Dry grinding machine	-	93.8 - 99.0	6.48 - 6.58
4	Wet grinding machine	-	110.8	2.39
5	Stone cramming/plastering (“tret da”)	-	102.6	5.24
6	Stone cutting machine 1400	-	105.3 - 111.7	1.77- 4.30
7	Stone gluing/sticking	-	62.7	0.75
8	Making “background”	560 - 845	80.6 - 88.8	2.12 - 2.78
9	Rough carving	-	85.3	3.48
10	Chopping stone	-	84.7	3.50
	Maximum allowable limits (Permitted Hygiene Standards, MOH, 2002)	150 – 500	≤85	≤6.0

- Lighting

Most stone carving tasks in Ninh Van Village are performed outside. As a result, lighting depends on the outside conditions. It is good to take advantage of natural light, and researchers found that the lighting in outside workspaces was sufficient. Workspaces were usually under partial shelters or in the shade, to avoid the strongest sunlight. Tasks not done in the shade were stopped when it was too hot or if the sunlight was too strong. Heavy and outside tasks are not assigned to children in Ninh Van Village. Children were only found engaged in secondary tasks such as chopping stones, assisting principal workers in grinding stones, carving, etc). Child labourers’ most common tasks were making stone pictures, including making the “background” and carving the picture.

Researchers found that in some workshops where children were working, natural light was the main source of illumination and it varied widely throughout the workshop. For example, next to the door, illumination was up to 845 lux while in

the interior it was found to be only 560 lux. Stone carving is very visually demanding. There is no permitted hygiene standard for stone picture making but an illumination of 500 lux is acceptable for highly demanding precision tasks.

- Noise

Of the three focus sectors, the noise level was the highest in the stone-carving village. In the workshops of Ninh Van Village, with the exception of stone gluing/sticking, the noise levels recorded in most workspaces exceeded the Permitted Hygiene Standards. Although there were no children found working directly at the highest noise positions, such as splitting stone (105.3 -111.7 dBA) and cracking stone (97.7 - 103.6 dBA), some older children (16-17 years old) were found working as assistants in stone grinding and chopping. These tasks are all done very near to one another, so those children were nevertheless affected by the high level of noise. The noise in stone grinding areas exceeded the Permitted Hygiene Standards from 8.8 – 14 dBA.

In some workplaces where children worked making “backgrounds” and chopping stone, the noise levels sometimes exceeded the Permitted Hygiene Standards by 0.3–3.8 dBA.

- Dust

Dust in the Ninh Van stone-carving village is mainly limestone dust. The silicon (SiO₂) content in the limestone used in Ninh Van is not high, only 2.0–4.2%, and the permitted dust concentration for this kind of dust (with SiO₂ content <20%) is 6 mg/m³. The dust concentration in stone carving villages was the highest of the three focus sectors but most of samples taken still fell within the permitted limits.

In the Ninh Van stone-carving village, children were most often involved in chopping stones. The dust concentration in stone chopping areas was 3.5 mg/m³ - higher than in many other positions, but nevertheless within the permitted limits.

Older children are most often assistants to stone grinders. In grinding areas, the dust concentrations were found to be 6.48 – 6.58 mg/m³, an amount that exceeds the permitted limits.

Because most workshops are located in residential areas and most of the tasks are carried out outside or in partially outside areas, not only workers but also local people are affected by dust pollution. The concentration of dust and the silicon content of the dust are within safety limits, yet they can still have adverse effects on the health of those exposed to them.

3.2.3.2. Assessment of working conditions in Ninh Van

Table 17. Children’s subjective assessment of their work environment in Ninh Van

No	Factor at workplace	Percent of children that complained (%)		
		Full-time workers	Part-time workers	Total
1	Noise	71.4	87.6	83.3
2	Dust	57.1	85.7	80.0
3	Bad smell	25.0	51.0	43.4
4	Heat	0.0	53.6	39.1
	<i>Total</i>	24	64	102

The results of investigations into children’s subjective assessment of their working environment were similar to that of children in Dong Ky.

Child labourers most often complained of noise (71.4% of full-time workers and 87.6% of part-time workers) and although dust concentrations did not exceed the maximum limits, their second greatest complaint was the dust (80%).

Because of the dust, most workspaces are situated outside – where it can be very hot in the summer. Both employers and employees try to arrange their schedules so that they work in the cooler times of day. They usually work in early morning and finish in the late evening, avoiding work at noontime.

The workspaces of child labourers are usually close to the door or right under the eaves, thus are well ventilated. This could explain why the proportion of children complaining about heat and bad smells was lower than that of children in Dong Ky, despite high temperatures also being recorded in Ninh Van.

Table 18. Children’s subjective assessment of their working conditions in Ninh Van

No	Factor at workplace	Percent of children that complained (%)		
		Full-time workers	Part-time workers	Total
1	Risk of injury	33.3	49.0	47.8
2	Awkward postures	28.5	50.5	44.5

3	Psychological stress	14.7	46.5	37.9
4	Carrying heavy loads	0.0	10.5	7.9
	<i>Total</i>	24	64	102

The results of child labourers' subjective assessment of their working conditions show that the most common complaint is risk of injury (47.8%), followed by awkward postures (44.5%). The complaint about awkward posture is related to the bent, seated position that children endure in this type of work.

More part-time workers complained about risk of injury, carrying heavy loads, awkward postures and stress, than those that work full-time. This can be explained by the groups' different tasks. Full-time child labourers in Ninh Van make pictures, where working conditions are better, while part-time workers must also help to grind and chop stone.

Results from focus group discussions with parents and local health staff showed that injuries such as stone particles in the eyes are very common when chopping stone and making "backgrounds" for pictures. There are no statistics on this because people do not usually go to the commune health station for assistance. Instead, they self-treat using grass buds to remove the stone fragments. Informants reported that that was the most effective treatment. They did not think that their eyes could be damaged by infection (from the stone or the grass buds) and they did not see any need to use antibiotics. Therefore, it is very necessary to have guidelines on prevention and treatment of injury at the workplace.

3.2.4. Assessment of workload and psychological and physiological parameters of child labourers in Ninh Van

3.2.4.1. Results from field observations in Ninh Van

As mentioned above, child labourers are most often employed in making stone pictures.

The main tasks in stone picture making are chiselling, carving, making "backgrounds" and drawing, as described above. Of these, carving takes the longest time.

Carving requires repetitive movements but those movements need not be done at a "fixed" frequency. Children usually work bent over in a seated position, which is harmful to their musculo-skeletal system. In order to prevent work-related musculo-skeletal disorders, it is necessary to design workspaces more ergonomically, avoiding awkward postures and highly repetitive movements.

Case observations carried out in three-picture making workspaces showed that:

- The average recovery heart rate (during the 1st minute after working) was 108 beats per minute (three children, aged 9–13). The lowest one-hour

heart rate, recorded in a nine year-old girl, was 95 beats per minute. The highest heart rate, recorded in a 13-year-old boy, was 126 beats per minute. These heart rates are consistent with adult indicators of “heavy” and “” work loads.

3.2.4.2. Assessment of the psychological indices of child labourers in Ninh Van

a/ Short-term memory test

Table 19. Results of short-term memory test by age in Ninh Van

Age	Number of test-takers	Mean score	Standard Deviation (SD)
≤12	2	2	-
13	7	3.3	0.95
14	5	3.8	0.84
15	5	3.6	1.34
16	18	3.4	1.33
17	14	3.2	1.58
<i>Total</i>	51	3.3	1.29

Table 19 shows that, similar to Dong Ky, the mean scores from the short-term memory test (Figure-Memory Test) of children in Ninh Van varied according to age, but the difference in mean scores was not significant. Compared to the results of another study in children aged 12–15 in Tu Dan Commune, Hung Yen province,^[6] the mean test scores of children in Ninh Van were lower.

b/ Attention test (Landolt test)

Table 20. Results of test on ability to follow instructions by age in Ninh Van

Parameter	Age group		
	<15	≥15	Total
Number of test-takers	12	35	47
Mean	0.75	0.71	0.73

SD	0.16	0.13	0.14
Min	0.35	0.45	0.35
Max	0.96	1.00	1.00

Table 20 displays the ability of child labourers in Ninh Van to implement tasks accurately. The mean scores of the under 15 group seem higher than that of the 15 and above group, but the difference is not statistically significant.

Table 21. Results of test on work efficiency by age in Ninh Van

Parameter	Age group		
	<15	≥15	Total
Number of test-takers	12	35	47
Mean	239.08	242.22	241.42
SD	67.20	55.68	58.09
Min	114.89	88.00	88.00
Max	365.60	327.13	365.60

The work efficiency of child labourers in Ninh Van Village, as shown in Table 24, seemed better than that of children in Dong Ky and Hoa Hau (241.42 ± 58.09 in Ninh Van, compared to 230.89 ± 67.60 in Dong Ky and 197.47 ± 64.18 in Hoa Hau). However, neither this difference nor the difference between the age groups was statistically significant.

c/ IQ test (Raven test)

Table 22. Results of Raven test by age in Ninh Van

Age	Number test-takers	Mean Scores	Standard Deviation (SD)
≤12	2	44.0	4.24
13	6	41.8	5.95
14	4	43.8	4.43
15	5	39.6	5.50

16	16	36.6	8.92
17	14	33.3	9.64
<i>Total</i>	47	37.5	8.61

The results from the Raven test, shown in Table 22, indicate that, in contrast to results from Dong Ky, mean scores in Ninh Van decreased slightly by age and fell below 50% (under the median) when checked against MOET guidelines from 1992.^[3] However, the mean raw scores of children aged 12–15 in Dong Ky were higher than that of children of the same age in Tu Dan and Chi Dao Commune, Hung Yen province.^[6]

3.2.5. Diseases and health problems among child labourers in Ninh Van

3.2.5.1. Children’s self-reported symptoms and health problems in Ninh Van Village

Table 23. Children’s self-reported symptoms and health problems in Ninh Van (within past 12 months)

No	Symptom	Percent of children who reported the symptom (%)		
		Full-time workers	Part-time workers	Total
1	Musculo-skeletal pain	92.8	94.5	94.2
2	Cough	61.5	20.7	31.4
3	Headache	57.1	28.6	36.3
4	Sore throat	28.6	49.1	43.5
	<i>Total</i>	24	64	102

Musculo-skeletal pain was the most frequent complaint among child labourers in Ninh Van, with 94.2% complaining of the symptom. This was higher than in Dong Ky, where 61.3% reported the symptom. Is this high rate of musculo-skeletal pain related to lifting and carrying heavy loads? Workplace investigations showed that lifting and/or carrying heavy loads are unavoidable in stone carving work, though it is not common for child labourers to perform these heavy tasks. Indeed, findings from questionnaires showed that only 8.8% of respondents reported having to carry heavy loads. These findings do show that it

is essential to have training or provide children with information on how to avoid awkward postures and how to skilfully manipulate/handle heavy loads.

3.2.5.2. Results of health examination of child labourers in Ninh Van

Table 24. Results of health examination of child labourers in Ninh Van

No	Disease	Percent of children diagnosed with disease (%)
1	Rhinitis	20.5
2	Reflection defect	20.0
3	Itching and rash	15.2
4	Vascular disorder of the inner ear	11.3
5	Conjunctivitis	10.8
6	Blepharitis	9.2
7	Inflammation of the middle ear	6.4
8	Tonsillitis	1.8
9	Versicolor pytiriasis	1.5
	<i>Total</i>	67

The results of the health examination of child labourers in Ninh Van show that the most common diseases are Rhinitis (20.5%) and Reflection defect (20.0%), followed by itching and rash (15.2%). The high rate of Rhinitis and itching/rash match the disease model for dusty environments.

The rate of Conjunctivitis (10.8%) was rather high. Besides exposure to dust and unhygienic conditions, this disease could be related to occupational injuries such as stone debris lodged in the eyes, as well as to the treatment for such that was mentioned above.

3.2.5.3. Results of respiratory test of child labourers in Ninh Van

Table 25. Results of respiratory test of child labourers in Ninh Van

No	Respiratory diagnosis	Number with diagnosis	Percent with diagnosis (%)
1	Normal	59	86.7
2	Restrictive syndrome	9	13.2
3	Obstructive syndrome	0	0
	<i>Total</i>	68	100

Among the 68 children in Ninh Van that took the respiratory test, nine (13.7%) had restrictive syndrome. Respiratory symptoms were among child labourers' most important health concerns, and these should be monitored in dusty environments.

3.2.5.4. Hearing loss among child labourers in Ninh Van

The results of hearing tests on 68 child labourers in Ninh Van show that:

- Air-track audiography:
 - o At a frequency of 1000Hz, one child had slight hearing loss and one child had medium hearing loss in the right ear; four children had slight hearing loss and one had medium hearing loss in the left ear.
 - o At a frequency of 4000Hz, three children had slight hearing loss and one had medium hearing loss in the right ear; two children had slight hearing loss in the left ear.
- Bone-track audiography: results shown in Table 26, below

Table 26. Results of audiometric assessment of child labourers in Ninh Van (bone-track test)

No	Frequency (Hz)	Number of cases			
		One ear		Two ears	
	Level of hearing loss	Light	Medium	Light	Medium
1	500	2	-	1	-
2	1000	-	-	-	1
3	2000	1	-	-	1
4	4000	-	-	1	1

	<i>Total</i>	68
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The results presented in Table 26 show that there were some cases of slight and medium hearing loss at different frequencies. No children had the typical audiogram of occupational hearing loss. However, there was one case of medium hearing loss in all three frequencies (1000Hz, 2000Hz and 4000Hz). It is necessary to follow-up on this issue and ensure both appropriate and timely prevention and interventions.

3.3. Results of field research in the Hoa Hau Traditional Textile Village (Ly Nhan, Ha Nam)

Hoa Hau, which includes the villages of Nhan Hoa and Nhan Hau, is a traditional textile commune with a long history of production. It belongs to Ly Nhan District, Ha Nam Province. Hoa Hau is approximately 8.7 km² and is divided into 25 hamlets. The population in Hoa Hau at the end of 12/2008 was 14,175 people (6,634 males and 7,541 females). There were 3,715 households and 3,726 people were under 18 years of age (2,090 males and 1,636 females), including 2,459 who were under six years old (1,229 males and 1,230 females). In Hoa Hau, 2,476 households, 8 companies and 9 co-operatives were engaged in textile production in 2008. There was an average of 3-4 weaving machines per household.

Regarding health, the Hoa Hau Health Station reported that in 2008, the most common ailments for which residents were examined and treated were respiratory infections (37.3%), blood circulation disorder in brain (11.0%); gastrointestinal disorders (9.9%), musculo-skeletal problems (7.5%), dental problems (6.5%), cardiovascular disease (6.4%), nervous disorders (5.2%), skin diseases (5.0%) and eye ailments (4.6%).

3.3.1. Description of textile production process in Hoa Hau

a/ Preparation of material

- Cotton or synthetic fibre is spun
- Thread is stiffened and dyed, if necessary
- Thread is made into small weaver's shuttles, as per the requirements of the product

=> *Occupational hazards:* In this part of work, occupational hazards include:

- o Cotton/synthetic dust (risk of byssinosis)
- o Chemicals (stiffening and dyeing chemicals)
- o Noise from shuttle-making machines

2/ Creation of textiles

- Put weaver's shuttles into the weaving machine => Set up horizontal and vertical lines as per the product requirement => Turn on the machine and monitor for mistakes (i.e. broken fibres) => Reconnect broken fibres

=> Occupational hazards: In this part of work, occupational hazards include:

- o Cotton/synthetic dust (risk of byssinosis)
- o Noise from the weaving machines
- o Risk of injury from the weaving machine (most machines are rudimentary and uncovered)

3.3.2. Child labour in Hoa Hau

In Hoa Hau Village, most materials are prepared by entrepreneurs and then distributed to households. Most children, especially girls, begin weaving at home from the age of six or seven. This is considered a kind of "housework" and they do it in order to help their parents. Older children, from the age of 14 or 15, may be employed full-time in textile co-operatives or companies.

Similar to Dong Ky and Ninh Van, most households in Hoa Hau Village have a crowded workshop that is either inside or adjacent to their living areas and there are no clear divisions between the different work places. Therefore, most child labourers in household textile production are affected by the occupational hazards connected to all parts of the production process because they work beside adults and even live their daily lives in the work environment. Cotton dust and noise are their main occupational hazards.

In Hoa Hau, as in Dong Ky, child labourers may work full-time or part-time, and be paid or unpaid (household/family enterprises generally do not pay their children), depending on the children's age, ability and condition. Therefore, the time study participants spent on work varied widely.

+ Full-time work: Most children stop going to school (usually at grade 9) and start working full-time when they are 14 or 15 years old. Some older children are enrolled in school and only work full-time during the summer, but the number of such children is quite low. Most work for small enterprises. There, depending on their skills and abilities, they handle 4–5 weaving machines and work for 8 hours a day on average. In some cases they work up to ten hours a day. Full-time child labourers are usually paid. Children receive a salary based on their production (on average, one child can handle 4–5 weaving machines and get 4,000–5,000 VND per hour)

+ Part-time work: This type of work is the norm for younger children and/or children who are still going to school. Most of these children work at home. As their work is considered a kind of "house work" to help their parents, it is unpaid. Depending on their skills and abilities, they may do "main tasks" (i.e.

weaving cloth) or “minor tasks” (i.e. spinning, connecting thread/fibre). Because they work for their own family and because they have to go to school, these children are able to work more flexible hours – usually just when they have time. They work more in the summer and less during the school year.

The following are some examples of a typical daily schedule for child labourers in Hoa Hau. Information is drawn from focus group discussions with the children.

Daily diary:

I have stopped schooling.

I have been working (full-time) since when I was 15 years old.

I am working for a private enterprise in the village.

On average I work for 8 hours/day, sometimes to 10 hours/day. I have to “look after” for 4 – 5 weaving machines at workplace.

The income I get from this job is depended on my working time: I get 4.000VND for 1 working hours.

For my daily activity: I usually get up early in the morning, have breakfast at home and then go to work. I work there from 6:30 – 11:00, and then I come back home for lunch and have a short snap/relax after lunch time. I come back to work at about 14:30 and work in there until 17:00 – 17:30. Then I come back home for dinner. Sometimes, especially in summer, I work even later.

Female, 17 years old, full-time work

Hoa Hau Village

Daily diary:

I started learning ‘on-the-job’ at my family’s workshop when I was nine or ten years old.

My family has five weaving machines. I work at home to help my parents.

In the summer I work about four or five hours/day. During the school year my parents don’t allow me to work. I can only work in my spare time, after I’ve studied (1–2 hours a day) or not at all. I don’t have to work if I have school or need to study at home.

In the summer time, then, I usually work in the morning (7:00–10:00), afternoon (14:30–17:00) and evening (19:30–21:00). I also help my parents prepare lunch and dinner.

I love working because I want to help my parents.

My tasks are monitoring the weaving machine, together with my mother, and spinning.

*Female 12 years old, part-time work
Hoa Hau Village*

3.3.3. Assessment of working conditions in Hoa Hau

3.3.3.1. Work environment in Hoa Hau

a/ Climate

Table 27. Climate in Hoa Hau textile workshops

No	Workplace	Temperature (°C)	Humidity (%)	Air velocity (m/s)
	Outside	34.3 - 38.2	67 - 71.2	0.19 - 1.72
1	Weaving cotton cloth	34.6 - 36.9	66.7 - 70.7	0.16 - 0.32
2	Weaving brocade cloth	35.0	68.4	0.11
3	Spinning (“Se soi”)	35.8	68.8	0.26
	Maximum allowable limits (Permitted Hygiene Standards, MOH, 2002)	≤32	≤80	<2

Table 27 shows that temperatures in the workshops visited by researchers exceeded the Permitted Hygiene Standards by 2.6-4.9°C. Weaving cloth, the most common task for child labourers, was also the position with the highest temperature.

The air velocity in the workplaces is low. Researchers found no air velocity samples that reached the 0.5m/s recommended limit.

In several investigated workshops, children and workers themselves poured water on the floor at the lunch time in order to reduce temperature when they came back to work in the afternoon. This is a considerable measure to solve heat at work – However, electricity safety must be the most concern when applying this temporary solution in such unsystematic and unergonomic workplaces as in Hoa Hau Village because in many households electric wires and sockets were laid right on the floor.

b/ Environmental factors

Table 28. Environmental factors in Hoa Hau textile household workshops

No	Workplace	Lighting (lux)	Noise (dBA)	Cotton dust (mg/m ³)
	Outside	-	63.9 – 87.2	-
1	Weaving cotton/synthetic cloth	72 – 244	90.5 – 103.0	0.39 - 1.12
2	Weaving brocade cloth	147	95.7 – 104.1	0.29
3	Spinning	136	92.3 – 93.6	-
	Maximum allowable limits (Permitted Hygiene Standards, MOH, 2002)	≥ 500	≤85	≤1.0

- Lighting

Textile work is very visually demanding, so a good lighting system is a key workplace requirement. Table 28 shows that lighting was not adequate in the surveyed textile workshops.

+ Illumination power varied widely from one workshop to another. Samples varied from 72-244 lux.

+ As stipulated in the Permitted Hygiene Standards, the required illumination for textile-related tasks is ≥500 lux. However, researchers found that lighting was just 72–244 lux for workers weaving cotton/synthetic cloth, and 136 lux for spinners. This is far too low. In some workplaces, the illumination power was just 72 lux.

- Noise

The noise in all investigated workplaces exceeded the maximum allowable limit. In these workshops, children are mainly involved in weaving cloth – an area of the workshop where the noise levels exceed the permitted limit by 5.5–13 dBA. Whereas the noise in Dong Ky and Ninh Van workshops is sporadic, generated only when running the machines, noise in Hoa Hau workshops is continuous throughout the work day, and may go on for 10-12 hours a day. As a result, the risk of occupational hearing loss in textile production is higher than that of the other the other focus sectors.

- Dust

Researchers found that the dust in Hoa Hau weaving workshops is cotton dust. This can cause byssinosis in people with prolonged exposure.

The highest concentrations of dust were found in the workspaces where cloth is woven – i.e. the area where child labourers are most present. Concentrations varied from 0.39–1.12 mg/m³. The current Permitted Hygiene Standard for cotton dust in the workplace is 1 mg/m³. Thus, cotton dust concentrations in many workspaces in Hoa Hau are higher than the permitted limits.

In terms of working environment, it is of greatest concern that:

- + There is no physical separation of work areas, so hazards arising from one task affect all others in the workshop. Most workshops/enterprises are in residential areas, even right inside homes, so pollutants/occupational hazards can have a huge effect on the living environment and daily activities of the residents. Whether they work or not, children are exposed to occupational hazards throughout the day and into the night.

3.3.3.2. Assessment of working conditions in Hoa Hau

Table 29. Children’s subjective assessment of their work environment in Hoa Hau

No	Factor at workplace	Percent of children who complained (%)		
		Full-time workers	Part-time workers	Total
1	Dust	93.7	92.6	93.4
2	Noise	92.5	92.6	92.5
3	Heat	15.4	32.0	19.2
4	Bad smell	8.8	0.0	6.7
	<i>Total</i>	91	27	122

Investigations into children’s subjective assessment of their work environment in the Hoa Hau Textile Village showed that dust and noise were the children’s greatest concern (93.4% and 92.5%, respectively). Children employed full-time were slightly more likely to complain about the air quality (bad smell and dust), but the difference was not statistically significant. Children who worked part-time were more likely to complain about the heat. It is possible that full-time workers have been able to adapt to the heat (as some reported having gotten used to their working conditions), but that the dust and smell have become more irritating to them over time.

Table 30. Children’s subjective assessment of their working conditions in Hoa Hau

No	Factor at workplace	Percent of children that complained (%)		
		Full-time workers	Part-time workers	Total
1	Risk of injury	38.5	63.0	44.5
2	Awkward postures	37.9	33.3	36.9
3	Psychological stress	25.8	33.3	27.5
4	Carrying heavy loads	3.3	11.5	5.1
	<i>Total</i>	91	27	122

Child labourers’ subjective assessment of their working conditions in Hoa Hau Village shows that:

- + The complaint rate for all factors was lower than that of children in Dong Ky and Ninh Van.

- + The most common complaint regarded risk of injury at the workplace (38.5%) and awkward postures (37.9%). Focus group discussions with employers showed that the main cause of injury in the textile process is being struck by the flywheel of the weaving machines. One of the most basic rules of ergonomic safety is that all moving units must be covered, but in Hoa Hau village none was. Therefore, this was a clear and acknowledged risk of injury to workers.

3.3.4. Assessment of work load and psychological and physiological parameters of child labourers in Hoa Hau

3.3.4.1. Results of field observation in Hoa Hau

Case observations of textile workshops in Hoa Hau Village showed the following:

The main tasks of the textile production process include:

- + Warping the loom: threading the yarn/thread on the loom (usually done by adults)
- + Starting-up the machine (when starting work, and when re-starting after joining/connecting yarn/thread or changing bobbins)
- + Joining/connecting yarn/thread

+ Changing bobbins

+ Walking from one machine to another to monitor the weaving process (in order to look for mistakes, such as broken yarn/thread or empty bobbins etc., and fix them quickly)

One child takes care of anywhere from 1-5 weaving machines and production time depends on the number of machines and the difficulty of the products. The tasks of child labourers are restricted. For example, weaving brocade cloth is more difficult than weaving cotton or synthetic cloth, so only skilful adolescents and adults can do this.

The time child labourers need to perform textile production tasks is presented in Table 31, below.

Table 31. Time child labourers spend per task

No	Task	Time (seconds)	
		5 machines	2 machines
1	Start-up machines	30 (5-55)	37 (15 – 95)
2	Join/connect yarn/thread	29 (15 – 60)	35 (20 – 90)
3	Change bobbins	26 (10-45)	115 (25 -300)
4	Walk and watch machines	90 (30-240)	200 (170 – 300)
5	Continuous working time of a working cycle	357 (85- 745)	-
6	Break time between tasks	48 (35-50)	-

Table 31 presents the amount of time that child labourers must spend per task when producing textiles, based on observations in Hoa Hau. As the results show, textile production is monotonous and highly repetitive work, though repetitive movements are not steadily maintained. In addition, the work can be stressful. The level of stress depends on the number of weaving machines that a child must look after. If a child has to look after five machines, then the total time of continuous attention can be up to 80%. It should be noted that, due to the characteristics of small/household enterprises – i.e. rudimentary equipment and a more flexible schedule – children are more able to manage their work pace, especially when they are working at home.

The heart rate of four children aged 13–17, taken during the 1st minute of recovery after work, was 94 beats per minute on average (85–105 beats per minute). This is equivalent to the recovery heart rate of people doing heavy work.

In order to make a comparison, researchers also monitored four adults working in the same workplace. The results showed that the adults' average heart rate during the 1st minute of recovery after work was 79 beats per minute (73–87 beats per minute); in other words, the heart rate of moderately heavy work. This illustrates how a workload that is medium for adults can be heavy for children and adolescents. This reinforces the need for further studies to establish suitable Permitted Hygiene Standards for child labourers.

3.3.4.2. Results of psychological tests on child labourers in Hoa Hau

a/ Short-term memory test

Table 32. Results of short-term memory test by age in Hoa Hau

Age	Number of test-takers	Mean Score	Standard Deviation (SD)
≤12	9	3.6	1.01
13	19	3.8	1.17
14	30	3.2	1.04
15	15	3.6	1.40
16	8	3.6	1.06
17	5	4.2	1,30
<i>Total</i>	86	3.6	1.15

Table 32 shows that, similar to Dong Ky and Ninh Van, the mean scores for the short-term memory test (Figure-Memory Test) of children in Hoa Hau varied according to age. The mean scores of children in Hoa Hau (3.6) were higher than that of children in Dong Ky (3.4) and Ninh Van (3.3), but lower than that of children 12–15 years of age in Tu Dan Commune (Hung Yen province).^[6] However, these differences were not statistically significant, due to the small sample size.

b/ Attention test (Landolt test)

Table 33. Results of test on ability to follow instructions by age in Hoa Hau

Parameter	Age group		
	<15	≥15	Total

Number of test-takers	46	24	70
Mean	0.74	0.71	0.73
SD	0.16	0.14	0.15
Min	0.23	0.31	0.23
Max	1.00	0.90	1.00

Table 33 shows the ability of child labourers in Hoa Hau Village to implement tasks accurately. Test results seem to show that younger children (less than 15 years old) were more able than older children (15 years or older), but the difference is not statistically significant (0.74 ± 0.16 as compared to 0.71 ± 0.14). This data is similar to that from Dong Ky and Ninh Van.

Table 34. Results of test on work efficiency by age in Hoa Hau

Parameter	Age group		
	<15	≥15	Total
Number of test-takers	46	24	70
Mean	183.43	224.38	197.47
SD	63.02	58.64	64.18
Min	34.77	112.67	34.77
Max	335.63	364.50	364.50

As shown in Table 34, the average test results for work efficiency (displayed by mean scores) of child labourers in Hoa Hau was 197.47 ± 64.18 , the lowest of the three focus sectors. The mean scores of children aged 15 years and older was higher than that of the younger group, but the difference was not statistically significant.

c/ IQ test (Raven test)

Table 35. Results of Raven test by age in Hoa Hau

Age	Number of test-takers	Mean scores	SD
≤12	10	34.9	6.62

13	22	37.0	7.42
14	32	35.1	9.39
15	18	33.5	13.06
16	8	37.3	8.28
17	5	38.4	8.17
<i>Total</i>	95	35.6	9.30

As mentioned in the report on Dong Ky, the Raven test is used to assess ability in systematic thinking, logic, and identification of relationships/connections between phenomena.

Test results from Hoa Hau Village showed that from age 12–16, the mean scores of child labourers ranged from 33.5 ± 13.06 to 38.4 ± 8.17 , which places them well below average, as compared to the reference population.^[3] The raw mean scores of children aged 12–15 in Hoa Hau were higher than that of children of the same age in Tu Dan Commune, but lower than that of children in Chi Dao, Hung Yen province.^[6]

3.3.5. Diseases and health problems of child labourers in Hoa Hau

3.3.5.1. Children’s self-reported symptoms and health problems in Hoa Hau

Table 36. Children’s self-reported symptoms and health problems in Hoa Hau (within the past 12 months)

No	Symptom	Percent of children who reported the symptom (%)		
		Full-time workers	Part-time workers	Total
1	Headache	87.0	83.3	86.2
2	Musculo-skeletal pain	84.2	91.1	85.8
3	Cough	47.4	42.9	46.5
4	Sore throat	42.4	42.9	42.5
	<i>Total</i>	91	27	122

Table 36 shows that the most common self-reported symptom was headache and musculo-skeletal pain (87.0% and 84.2%, respectively). Importantly, the proportion of children who reported frequent headaches was very high. This could be explained by constant exposure to high levels of noise, both during and after working hours. The relationship between headaches and noise exposure should be taking into consideration when following up on children's symptoms, monitoring their health and preventing further complications such as nervous breakdown, occupational hearing loss and other adverse effects.

3.3.5.2. Results of health examination of child labourers in Hoa Hau

Table 37. Results of health examination of child labourers in Hoa Hau

No	Disease	Percent diagnosed with disease (%)
1	Conjunctivitis	49.0
2	Tonsillitis	21.3
3	Itching and rash	20.2
4	Sore throat	20.2
5	Versicolor pityriasis	6.4
6	Inflammation of the middle ear	1.1
7	Blepharitis	1.0
	<i>Total</i>	95

Health examinations performed on child labourers in Hoa Hau showed that conjunctivitis was the most common disease (49.0%), followed by Tonsillitis (21.3%), itching/rash (20.2%) and sore throat (20.2%). The results of the clinical examination are in accordance with the disease model for dusty environments.

Although children work with inadequate lighting, as mentioned above, the clinical assessment found no cases of reflection defect.

3.3.5.3. Results of respiratory test of child labourers in Hoa Hau Village

Table 38. Results of respiratory test of child labourers in Hoa Hau

No	Respiratory diagnosis	Number with diagnosis	Percent with diagnosis (%)
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1	Normal	60	66.0
2	Restrictive syndrome	31	32.0
3	Obstructive syndrome	2	2.0
	<i>Total</i>	93	100

The results of a respiratory test on 93 children in Hoa Hau Village revealed that 31 children (32%) have restrictive syndrome and two have obstructive syndrome. Among these, eight children reported that they often and three reported that they occasionally had difficulties breathing.

Textile production is an occupation that carries a high risk of byssinosis. According to L. Trung (1997), epidemiological investigations in many countries have found that at least 40% workers exposed to cotton dust acquire this disease. A respiratory test is one of the most important methods for diagnosing byssinosis. The results of the respiratory test, presented above, together with the self-reported symptoms of children engaged in textile work show that this is an emerging health problem among children exposed to cotton dust in Hoa Hau Village. It is essential to carry out more specific and in-depth health examinations on the children working there. A periodic health examination, as well as an occupational health examination, is very necessary.

3.3.5.4. Hearing loss among child labourers in Hoa Hau

Table 39. Results of audiometric assessment of child labourers in Hoa Hau (bone-track test)

No	Frequency (Hz)	Number of cases			
		One ear		Two ears	
Level of hearing loss		Light	Medium	Light	Medium
1	500	1	-	-	-
2	1000	3	-	-	-
3	2000	3	-	1	3
4	4000	1	-	1	1
5	8000	1	-	-	1
<i>Total</i>		88			

Results from a bone-tract hearing test administered to 88 child textile workers in Hoa Hau revealed one child with hearing loss in one ear at a frequency of 500Hz. However, at a frequency of 1000Hz there were three children with hearing loss in one ear. At a frequency of 2000Hz, the number of children identified with hearing loss increased significantly: four cases of hearing loss in both ears and 1 case of hearing loss in one ear. There was also one child with slight hearing loss in one ear at 1000Hz, and medium loss at 2000Hz, and three children with hearing loss at 2000Hz. There was one case of medium hearing loss at high frequencies (2000Hz and above) and this child – a 14-year old girl who does textile work for her family – also showed a typical diagram of hearing loss resulting from noise pollution.

Textile production carries a high risk of occupational hearing loss. In a traditional textile village, children begin working when they are very young. Moreover, textile workshops are located in living areas, which greatly heightens the risk of adverse effects from noise. An analysis of the working environment, living environment and the results from hearing tests shows an urgent need for further health examinations and follow up on occupational arrangements for children as well as adults.

In addition, information gleaned from in-depth interviews with healthcare staff in Hoa Hau showed that the number of mental problems among people in Hoa Hau is higher than that of other neighbouring communes. Due to limitations of time and other conditions, this research study could not focus more on this problem. Nevertheless, further studies are strongly recommended.

IV. DISCUSSION

4.1. Status and trends in child labour within the focus sectors

4.1.1. Child labour

Child labour is common in all three villages. However, there is no statistical data on child labourers (number, sex, age of starting work, time spent working, types of work done, etc.) in any of these areas. Child labourers that help their parents (e.g. in household carpentry or textile workshops) do not usually work full-time. Likewise, children from other areas come to the handicraft villages to work seasonally as migrant workers. Local authorities face difficulties in trying to monitor this special, unofficial labour force.

Interview and focus group participants explained that children and adolescents work mainly because:

- (1) Child labour is natural.
- (2) When children work, the family can monitor them and keep them away from social evils.

(3) Child labour increases the family's income.

(4) Working helps children gain professional skills for the future.

In general, people in all three villages pay attention to and create good conditions for their children to study. If it happens that the children are not able or do not like going to school, then they can join in the traditional occupation of their village.

“They [children] work in part to increase the family income, but mainly so that we can manage/control them. Otherwise they would be affected by drugs, gambling and electronic games. Nobody forces them. They are even happy to work with their parents. Working with 1m³ (of stone), can earn them thousands of dong”

(Representative of the Women's Union, Ninh Van)

- In the Ninh Van stone-carving village, most child labourers are local people. They work for their parents and/or their relatives and neighbours. In Ninh Van, a Centre of Community Education was established to train local children and children from other communes and provinces. In this centre children can learn the trade from skilled craftsmen. Previously, this centre only offered training at the intermediate level, but it has since upgraded and now offers advanced training (high school equivalent). According to a representative of the local government, 5–6 children in each commune participate in these training courses.

- In the Hoa Hau textile village: Similar to Ninh Van, most child labourers in Hoa Hau are local people and most work for their family in their own household workshops. Only older children/adolescents or school dropouts work full-time for local enterprises/workshops.

- In the Dong Ky carpentry village: child labourers from other areas are predominant, especially in mother-of-pearl inlay work. However, because this study took place when production in Dong Ky had declined remarkably due to the Global Economic Crisis, there were fewer child labourers than normal from other areas.

Gender: More boys than girls are engaged in stone carving, but in textile work it is the opposite, with more girls than boys involved. This study found that there were twice as many male as female child labourers in stone carving work in Ninh Van. However, complete data on child labourers is not available for either sector. Researchers did not find any significant gender differences in carpentry.

Age: The ages at which children start to work differ greatly depending on the job. Results of interviews with the parents of child labourers showed that:

- In stone picture making: Children 16-17 years old work at all stages of the process. Children from the age of ten or even younger manage simpler parts of the process, such as tracing, outlining the pictures and chopping and trimming the background.

+ Carpentry: Children of 16-17 years of age handle sawing chiselling and assembling. Although children can do sanding from about age ten, full-time child labourers usually only do this from the age of 15. Children aged 12-14 were best at cutting conch splinters.

+ Textile production: Children get involved in sorting and spinning from about the age of ten. By the time they are 12-14 years old, most children are simultaneously operating 4-5 weaving looms.

4.1.2. Work assignment

In all three focus sectors, children usually only participate in “light” tasks.

“Parents only ask their children to do light jobs. They [the children] don’t extract or carry stones. They only arrange or pack them.”

(Representative of local authorities, Ninh Van)

“Making a four-seasons picture only requires the use of small, light tools. Children can do that.”

(Representative of the Youth Union, Ninh Van)

4.1.3. Work and schooling

Of the child labourers surveyed, 65.5% were still in school. Rates of school attendance differ between areas. In Hoa Hau, 81.9% and in Ninh Van 71.7% of child labourers go to school. In Dong Ky, however, only 39.6% attend. It is possible that child labourers in Dong Ky come from other communes, districts or provinces and are not able to continue their studies in local schools.

The development of traditional handicraft villages has contributed to the improvement of people’s living standard. In all three areas, local people place great importance on their children’s education. As a result, this research study found that most full-time child labourers were children who had failed to enter university or upper secondary school.

“Now everyone has only a few children, so everyone expects his/her child to study well. But if they are not able to study, and if they do not work, then how are they going to have money to live on? If they were able to study, we would let them.”

(A mother who has child engaged in work, Hoa Hau)

Among those surveyed, two girls had a primary education and over 70% had a secondary education. The remainder studied at the senior high school level. The rate of boys with secondary schooling was slightly higher than that of girls (30% compared to 22.4%).

4.1.4. Psychological issues

Of the surveyed children, 35% said that they liked their job, 52.4% said they neither liked nor disliked it, and 12.5% they disliked it but they had to do it.

The proportion of children who liked their job in Ninh Van and Dong Ky was similar (27% and 26.1%), but it was much higher (47.1%) in Hoa Hau.

From the point of view of occupational psychology, disliking one's job is a main factor in occupational stress. Tasks that are too simple, monotonous or repetitive, or a job whose results the workers do not see, or a lack of encouragement in workplace, are all very damaging.

Employers should be concerned with workers' psychosocial condition and ergonomics in order to eliminate those negative factors.

In Hoa Hau, workers directly see the results of their work (for example, how many meters of cloth they have done). Moreover, textile production requires specialized skills and the majority of tasks are done at home. These factors may help to explain why children in Hoa Hau reported higher job satisfaction, as compared to children in Dong Ky and Ninh Van.

4.2. Working conditions and work environment

In all three focus sectors, the most important environmental factors were dust, noise and heat, but these varied greatly by sector.

4.2.1. Climate

The characteristics of the working climate in the three sectors were different: In Dong Ky and Ninh Van work is done outside or under partial shelter, near windows or doors, so that it is greatly influenced by the outside climate. In Hoa Hau, work is done indoors, where there are many textile machines and other equipment, so the climate depends on the quality of the workshop, its ventilation, the number of machine operating, etc.

Usually the places where children work are the hottest.

- In Dong Ky: At the time of this study, the temperature was 28.6 - 32.0°C in sanding areas, and 30.8 – 32.5°C in wood scraping areas. In some work spaces, air velocity exceeded 2m/s – a speed that Vietnam's occupational health guidelines recommend avoiding.

- In Ninh Van: Researchers measured temperatures of 33.4 – 34.1°C in areas where stone “backgrounds” were made, and 35.6°C in stone chopping areas.

- In Hoa Hau: The temperature inside weaving workshops was measured at 34.6- 36.9°C.

Studies done by Nguyen Ngoc Nga and Nguyen Van Hoai et al. showed that between 25°C and 35°C, an individual's capacity for physical work decreases by 18%. Another study on textile workers in a government enterprise who worked at

33.4 – 38°C showed that each person secreted 2.16L of perspiration during each work shift. This is a significant loss. It is essential that those working in hot environments take special care to replenish fluids and essential minerals, particularly salts and potassium (K).

Allowance thresholds for factors in the workplace climate are closely related to the physical nature of the job – in jobs requiring heavy physical labour, for example, the maximum allowable temperature is lower than it would be for non-physical work. As already noted, jobs considered “light” for adults may be “medium” or “heavy” for children. Moreover, children and adults respond differently to climatic conditions. Thus, it is unreasonable to evaluate children’s work environment using occupational health and safety tools and standards designed for adults.

In some of the areas where child labourers work, researchers found an air velocity of over 2 m/s, even though Vietnam’s Permitted Hygiene Standards prohibit air velocity in the workplace to exceed 2.0 m/s. Research outside Vietnam has even recommended that air velocity in the workplace should not exceed 1.5 m/s, because, more than that and workers’ bodies will have adverse effects.

4.2.2. Environmental factors

a/ Dust

In addition to having an unacceptable climate, researchers found that child labourers’ work spaces had a higher dust concentration than other areas of the handicraft workshops.

- In Dong Ky: Dust concentration in sanding areas was 0.835-2.52 mg/m³

- In Ninh Van: Dust concentration in stone chopping areas was 3.5 mg/m³ and in stone grinding areas 6.48-6.58 mg/m³

- In Hoa Hau: Dust concentration in textile weaving areas was 0.39-1.12 mg/m³

In general, the dust concentrations recorded in Dong Ky and Ninh Van did not exceed the maximum limit (except in stone grinding areas). Nevertheless, even those relatively low levels could have adverse effects on workers’ health. In fact, monitoring of occupational and environmental diseases, carried out by some Provincial Preventive Medicine Centres, has indicated cases of silicosis among workers who have been exposed to limestone dust under the MAC (Maximum Allowable Concentration).

This study has identified cotton dust (in Hoa Hau) as a major problem in need of more attention. In some workplaces, researchers found that the concentration of cotton dust exceeded the allowable limit. This is a cause for concern because exposure to cotton dust can lead to byssinosis – a disease that is on the list of compensated occupational diseases in Vietnam.

b/ Lighting

In Dong Ky and Ninh Van, most lighting was natural light and the illumination power in all workplaces met the requirements.

In Hoa Hau, most workshops provided their own lighting and the recorded illumination was just 72-244 lux – much lower than the requirement set out by the Permitted Hygiene Standards, which is 500 lux.

Proper workplace lighting is essential, and its importance is recognised within the Occupational Health and Safety standards of most of countries. Proper workplace lighting brings many benefits to both employees and enterprises:

- It allows employees to comfortably see what they are doing, without straining their eyes and bodies.
- It makes work easier and more productive.
- It draws attention to hazardous operations and equipment.
- It helps prevent costly errors and accidents.

Employers should understand the benefits of proper lighting and how to install it so that they can set up and maintain good lighting systems and train their employees on how to use them.

c/ Noise

Noise levels in most work spaces exceeded the maximum allowable limits.

The noise in the three areas differed: In Dong Ky and Ninh Van noise was sporadic or intermittent and only came from some machines or processes, whereas in Hoa Hau it was continuous.

The situation most in need of attention is that of textile weavers. In Hoa Hau Village, as in most textile factories, noise levels are consistently high. In Hoa Hau they were recorded at 90.5-103 dBA.

In all three focus sectors, enterprises overlap with living areas and the dust and noise from handicraft production greatly affects the health of living areas. Even outside workshops, noise was recorded at 60 to more than 80 dBA. Thus, even if they are not working, all people in the area, and particularly children, are affected by workshop noise.

4.2.3. Chemicals

Measurements taken in Dong Ky Village indicate that solvents used in painting have contaminated the surrounding environment. Children may be affected by this pollution. Although the concentration of solvents was low, analysis showed the presence of many different kinds of solvents, some of which were even unknown and/or unlabeled. Not only children but also all people working and living in carpentry areas may be affected by long-term exposure to an accumulation of these chemicals.

In Ninh Van, chemicals are used to glue broken stones. However, no one questioned by researchers could tell what kind of chemicals these were nor what their content or formula was. Workers buy the chemicals from shops where the bottles the chemicals are sold in are reused and unlabeled bottles.

4.2.4. Physiological parameters

Informants in all three focus sectors considered the work of child labourers “light.” In order to estimate their workload, researchers measured the child labourers’ heart rate.

Researchers found that, despite the designation of child labourers’ work as “light”, in some workplaces their recovery heart rates in the first minute after working were as high as 90 to over 120 beats per minute: equivalent to the heart rate of children performing heavy work or adults performing very heavy work.

All current standards of occupational health and safety in Vietnam are targeted at and designed for adults only. It is essential to design tools appropriate for children, so that the work load and working conditions of child labourers can be better understood and monitored. Occupational health standards for child labourers are needed in order to illuminate the real situation of child labour in Vietnam.

4.2.5. Work load (time)

The amount of time that part-time child labourers spend working is flexible. As they are going to school at the same time, they help their families by working outside of study hours.

Full-time child labourers have a set schedule of eight hours per day. However, this study found that they are often obliged to work longer hours because:

- + Their salary is paid according to how much they produce (especially in the textile industry).

- + Their work is seasonal.

“In October, November and December we sometimes have to work all night to give customers their goods in time for the Tet Holidays. Children have to work for us then.”

(Employer focus group discussion, Hoa Hau)

4.2.6. Work safety

a/ Injury in the workplace:

There was a substantial risk of injury in each workplace studied.

- In Dong Ky: Common injuries were cuts on fingers and toes and scratches on skin.

- In Ninh Van: The most common injuries were stone fragments and debris in eyes and cuts on hands.
- In Hoa Hau: Most injuries were the result of being hit with moving machine parts (e.g. the fly-wheel).

The above injuries are not reported and are not found in official statistics and data.

No moving machine parts are covered and all work places are untidy, so none of the work places covered by this research study can be considered safe. .

In case of injury, the injured party receives assistance based on local know-how, not on medical training or any knowledge of first aid.

b/ Protective equipment

The workplaces surveyed had no standard personal protective equipment for child labourers. In a very few cases employees were provided with a cloth mask but these, do not prevent the inhalation of dust and chemicals.

In Ninh Van, some workshops had goggles available, but few workers used them. The reason given was that the goggles were the wrong size and were uncomfortable to wear while working. Some child labourers who worked cutting and grinding stone said that goggles fog up easily from breath and dust while working, so that poor visibility made them more vulnerable to injury than not wearing the goggles at all.

Finally, because the moving parts of machines are not covered and workplaces are untidy, safety standards were found inadequate in almost every workshop researchers visited.

Finally, educating employers and employees on what to do when injuries occur is essential to preventing injury at the workplace.

c/ Work posture and ergonomics

Researchers found that in all three focus sectors, workplace design is unergonomic and child labourers are obliged to work in awkward positions with poor postures. In Ninh Van and Dong Ky. children sit bent over while working. In Hoa Hau, child workers stand and walk. Awkward postures can lead to musculo-skeletal disorders.

The majority of child labourers' tasks were simple, monotonous and repetitive.

d/ Violence at work

Researchers did not at any time during the study period observe violence in the workplaces, nor did children in Dong Ky and Hoa Hau report having been beaten or maltreated in their workplaces. The exception is Ninh Van, where seven children reported that they had been beaten in the workplace by their parents or relatives.

No violence (including beating, harassment, physical, verbal, or visual sexual harassment, intimidation and threats) was identified by the survey.

4.3. Effects of working conditions and work environment on child labourers' health

This initial study has revealed some important effects of working conditions and the work environment on child labourers' health.

4.3.1. Child labourers' complaints regarding their working conditions

- In all three sectors a very high proportion of child labourers complained of noise (83.3–92.5%) and dust (80–93.7%).
- 36.9–44.5% of child labourers complained of working in awkward positions.

Most of the enterprises assessed by researchers were small ones with narrow, cramped workshops. The arrangement of workplaces and hours and the organization of tasks and tools were unsystematic, and housekeeping was generally inadequate. These factors make working conditions more uncomfortable (by leading to dust, awkward postures, etc.) but could easily be improved, significantly, by applying ergonomic solutions such as re-designing work spaces, re-arranging the workplace and providing personal protective equipment.

4.3.2. Self-reported symptoms

According to the survey of self-reported symptoms and health problems, musculo-skeletal disorders are child labourers' greatest physical complaint. This may be related to their working postures, which are frequently very awkward (i.e. bent over). The children's musculo-skeletal disorders were not chronic, but tended to come and go. This is a major concern because children are in a crucial development stage and repeated work-related musculo-skeletal disorders can affect their future growth.

The rate of children reporting upper respiratory track conditions such as coughing and sore throat was also rather high, at 31.4–43.4%. This may be related to their exposure to dust.

The rates of children reporting headaches in Ha Nam and Dong Ky were 36.3% and 38.3%, respectively. The rate was very high in Hoa Hau (86.2%). The frequency of headaches was related to continuous exposure to high noise levels.

Adult workers in Ninh Van and Hoa Hau reported that many people started working at the age of 10 or 11, and by the time they were 40 years old most of them were suffering from back and chest pains. These pains are most likely the outcome of work-related respiratory diseases and back pain.

This study recommends that, in addition to a follow-up study on child labour, a retrospective study should be carried out on handicraft workers in the three focus sectors who have been working since they were young.

4.3.3. Results of health examinations

a/ Respiratory complications

Seventy-three child labourers received medical examinations from specialists and general practitioners. The results of these examinations show a high rate of children with upper respiratory track problems (such as sore throat and rhinitis), conjunctivitis and itching/rash – all of which could have been caused by exposure to dust. Respiratory tests identified many cases of restrictive syndrome (31/93 children in Hoa Hau, 9/68 children in Ninh Van, 22/74 in Dong Ky), and some cases of obstructive syndrome (two in Hoa Hau, one in Dong Ky).

b/ Hearing loss

Child labourers in all three sectors are in danger of losing their hearing. Audiometric tests done on children in each village found hearing loss at different frequencies.

Remarkably, children in Dong Ky exhibited greater hearing loss than children in the other two villages, despite the fact that noise pollution in Dong Ky was by far the lowest of the three. Hearing loss in Dong Ky was greatest at 500Hz and 2000Hz, as detailed above.

Though it is beyond the scope of this research to investigate this anomaly, it should be pointed out that some recent research has identified a link between hearing loss and exposure to solvents. For example, a study on chemically-induced hearing disorders found that solvents, heavy metals and chemicals induced anoxia. Also, in studies with rodents, a permanent decrease in auditory sensitivity to high-frequency tones was demonstrated following weeks of high-level exposure to toluene. Similar effects have been found in exposure to styrene, xylenes and trichloroethylene. Carbon disulphide and *n*-hexane may also affect auditory functions, though their major effect seems to be on more central pathways. Finally, several human cases have been reported wherein auditory system damage and severe neurological abnormalities followed solvent sniffing. When people work with solvents the risk of noise-due hearing loss was shown to be higher.

It is unknown whether the high rate of child labourers with hearing loss in Dong Ky is related to prolonged solvent exposure. In any case the concentration of solvents in the child labourers' environment was not high, when measured by researchers.

In Hoa Hau, audiograms were typical for noise-related hearing loss.

The medical assessment of child labourers, summarized above, raises a red flag about work-related health problems in all three focus sectors. The results

highlight the importance of using medical examinations to monitor general and occupational health, and in particular to monitor the health of child labourers, especially those exposed to hazards at work.

4.4. Laws and policies

4.4.1. Policy framework for occupational health and safety

The Labour Code

The Vietnamese Labour Code clearly stipulates the rights of all workers to adequate occupational health and safety protections in the workplace. The Labour Code also addresses the issue of child labour (see 4.4.2). The most relevant Articles of the Labour Code are paraphrased below, followed by a discussion.

Article 5: “Everyone has the right to work.”

Article 13: “The State, businesses and the whole society are all responsible to provide jobs and ensure that every person with labour capabilities has the chance to be employed.” As employees, child labourers have the same rights and responsibilities as all other employees. These rights and responsibilities are clearly and sufficiently stipulated in the Labour Code.

Article 95: “The employer has the responsibility to fully provide employees with equipment for labour safety and labour sanitation and to improve their working conditions.”

Article 97: “The employer must ensure that the place of employment meets the standards on space, ventilation, lighting and the prescribed maximum limits on dust, steam, noxious gases, radiation, magnetism, heat, noise, vibration and other harmful factors. These factors must be controlled and measured regularly.”

Article 98: “(1) The employer must provide regular control and maintenance of machines, equipment, building structures and storage according to the standards of labour safety and sanitation. (2) The employer must equip those parts of machines and equipment at the business that are likely to provoke accidents with requisite safety features and guards. At the workplace of the business, in places where machines and equipment are installed, and in areas where noxious and dangerous elements are present, arrangements must be made to provide protection against accident, including the posting of prominent instructional signs on labour safety and labour sanitation in visible places.”

Article 101: “An employee performing dangerous or noxious jobs must be equipped adequately with personal protection means. The employer must ensure the provision of means for personal protection, consistent with the standards of quality and design prescribed by law.”

Article 102: “The employee must be given a health check at the time of hiring and then periodic health checks according to the prescribed requirements; the cost of the health checks for the employee is to be borne by the employer.”

Article 102: “An employee suffering from an occupational disease must be provided with thorough treatment and periodic medical check-ups and a specific medical record must be maintained for that employee.”

Article 106: “A person suffering from occupational diseases must be given adequate treatment and care, undergo periodic medical examinations and have a special medical report.”

Discussion

Considering all the terms pertaining to occupational health and safety in the Labour Code, no business in our research has fulfilled their responsibilities vis-à-vis periodic examinations of the working environment, periodic health check-ups, occupational health tests, provision of personal protection equipment, and others.

All large and small-scale enterprises, and even individual employers, anyone who hires an employee must follow the directives of the Labour Code. (*Article 6:* "An employer may be a business, an office, an organization or an individual (in the latter case he/she must be at least 18 years old). The employer hires, utilizes labour and pays for that labour.") However, not a single enterprise in the three villages assessed by this research study is implementing the Labour Code. For example, no workshop is monitoring its climate and environmental factors and none is providing periodic medical examinations, occupational disease examinations, or personal protective equipment.

Also according to the *Article 6*, "An employee must have attained at least 15 years of age, have the capability to work and must work according to a labour contract." Yet no child in the three villages is working under a labour contract. Does working without a labour contract mean that they are not considered employees and are therefore not accorded the rights due them according to the stipulations of the Labour Code? Do employers avoid making labour contracts in order to evade their responsibilities to their employees? Certainly when children work for their families they are not considered (by the community) employees nor are they paid; they are not understood to be in a “labour relationship” and the law is not considered to apply to them.

This study found that child labourers in the three target villages are working outside of the law and policies that govern employment – and in particular, child labour – issues. Small scale enterprises often do not register, especially those run at the family level. It is telling of the authorities’ lack of oversight that those that did register and state their use of child labour suffered no consequences whatsoever.

4.4.2. Policy framework for child labour

The provisions of the Labour Code that pertain to child labour are listed below, followed by two key circulars and a discussion.

a/ The Labour Code

The Labour Code defines an adolescent labourer as a person between 15 and 18 years of age, and expressly prohibits the employment of children below 15 years of age.

Article 119: “A minor labourer is one under 18 years of age.”

Article 6: "An employee must have attained at least 15 years of age."

Article 119: “Where the employment of minors occurs, there must be a separate record of each minor's full name, date of birth, current jobs and the result of each periodic health check, which must be shown to the labour inspector on request.”

Article 120: “It is forbidden to employ children below 15 years of age, except for those professions and jobs to be defined by the Ministry of Labour, Invalids and Social Affairs.”

Article 121: “An employer is allowed to employ minors only for jobs suited to a minor's health, in order to protect the development of their physical and intellectual potential as well as their personality. The employer has the responsibility to care for the minor employee in the domain of labour, wages, health and education during employment.”

Article 122: “(1) The work hours of a minor employee may not exceed seven hours per day nor 42 hours per week. (2) The employer may assign minor employees to overtime work or night time work only in a number of occupations and jobs defined by the Ministry of Labour, Invalids and Social Affairs.”

Finally, Chapter XI of the Labour Code contains some regulations specific to minors but does not emphasise the responsibility of employers to treat child labourers as other labourers. Nevertheless, it is expressly forbidden to employ minors in heavy and dangerous jobs or jobs necessitating exposure to those noxious substances proscribed in the list published by the Ministry of Labour, Invalids and Social Affairs and the Ministry of Health.

b/ Circular No. 09/LB dated 13/4/1995 of MOLISA and MOH regarding the “List of jobs forbidden to children and adolescents”

The circular stipulates that the decision to ban child labour from certain occupations must be based on two factors:

- Working condition
- Type of job

Unfortunately, many provisions in the circular are either unnecessary or inadequate.

First of all, the circular raises a number of unnecessary issues. For example, many of the listed jobs require skills and a physical capacity that an adolescent labourer could not have, such as job No. 45 (Cutting wood with plate-saw and round saw) and No. 47 (Operating planers). In the carpentry village, adolescents were never found in these jobs.

Second, working conditions are sometimes confused with job descriptions. For example, job No. 51 is described as “carrying excessive loads” and job No. 58 is explained as a “job in areas with dust, stone particles, cement dust, coal dust, animal hair and other dust in excess of the hygiene standards.”

Some working conditions are forbidden to child labourers, but without any scientific basis. They are guided only by an extrapolation from the classification of adults’ working conditions.

For example, according to Condition No. 1 (extreme physical work: energy expenditure in excess of 4 kcal/min, heart rate of 120 beats per minute), physical work with energy expenditure in excess of 4 kcal/min is considered “heavy” physical work for a Vietnamese person weighting 50 kg. However, this adult standard is inadequate for an adolescent of 40 kg.

This research study found that when performing the same task, the average recovery heart rate during the first minute after work of four children aged 13-17 years was 94 beats per minute, while that of adults was 79 beats per minute. This demonstrates that children require greater effort than adults to do the same work, and the toll of work on their bodies is different. Another point of concern is that the circular does not clarify which heart rate indicator should be used (i.e. the average heart rate during work, the recovery heart rate, etc.)

In addition, the circular’s guidance is not always based on science. Condition No. 8, for example, sets a workplace temperature limit of over 40°C in the summer and over 35°C in the winter. There is no scientific basic for this. Firstly, the temperature threshold should be in relation to the physical activities performed by labourers. Secondly, according to the recommendation of the Vietnamese Occupational Hygiene Standards, in summer the workplace temperature should not exceed 32°C for light physical work. In fact, heavy physical work done at 37-38°C is considered extreme.

The three focus sectors of this research study did not employ child labourers in the jobs proscribed by the circular. However, some of the three villages’ working conditions are on the list of forbidden conditions.

c/ Circular No. 21/1999/TT-BLĐTBXH dated 11/9/1999 of MOLISA stipulating the “List of occupations, jobs and conditions for employing children under 15 years of age”

Circular No. 21/1999/TT-BLĐTBXH stipulates the four occupations and the eight conditions under which children under 15 years of age can work. This circular has some limitations:

Occupation No. 3 includes carpentry, but carpentry entails many different tasks,

some of which are very heavy. Following the list of prohibited conditions in Circular 09/TT-LBLDTBXH-YT (above), carpentry workshops should be banned from employing adolescent labourers.

The circular discusses the employment of children who are 12 years of age, even though even younger children take part in certain handicraft trades.

The law does not address the case of children working for their families.

4.4.3. Occupational health and safety standards

In Vietnam, occupational health and safety standards have been promulgated at many levels: National Standard, Branch Standard, and stipulations by circulars or decisions. But all of these standards are for adults. To apply those standards to child labourers would be unreasonable. The standards for child labourers should be based on indicators and parameters that are appropriate to children and sensitive to their special needs.

V. RECOMMENDATIONS

5.1. For Government agencies

- Revise Circular 09/TT-LB dated 13/4/1995 of MOLISA and MOH regarding the “*List of Jobs Forbidden to Children and Adolescents*” and Circular No. 21/TT-LDTBXH dated 11/9/1999 of MOLISA on the “*List of Occupations, Jobs and Conditions for Employing Children under 15 years of age.*”

- Communicate, educate and improve the awareness of employers, employees and community members so that they understand their responsibilities and the benefits of child protection.

- Make suitable policies and guidelines for child labour management.

- Revise the regulations guiding adults and employers in state and large scale enterprises so that the regulations can also apply to the small and medium scale enterprises where child labour is used.

- Provide employers, employees and the community with education and documents on the occupational health and safety of child labourers.

- Raise awareness about and mobilize greater involvement in the issue of occupational health and safety (OHS); encourage multisectoral involvement from all stakeholders (NGOs, Government ministries, individuals, etc.) and increase community access to OHS services.

5.2. For local government

- Strengthen the management of small and medium scale enterprises and carry out regular health and safety inspections.

- Improve the management of child labour, according to the law.

5.3. For the three focus sectors

- Children with work-related health problems should seek clinical follow-up and be provided with timely and special medical examination and treatment.
- Carry out a pilot intervention with community participation. Based on the results of the pilot, set up guidelines on health promotion in the workplace for the general community and, in particular, for places where child labour is in use.

5.4. Research

5.4.1. Based on the results of investigations in the three focus sectors, further in-depth research should be done in the field of traditional occupations in order to determine how working conditions affect children's health. Future research should work with a larger sample size, cover more areas, and include a retrospective study on people who have been employed in the same tasks since their childhood. The latter would be useful for evaluating the long-term effects of working conditions. Such further studies would help to design interventions and tools for researching occupational health and safety in children, as such are not now available.

5.4.2. Investigate the working conditions and health of children in other villages where the local economy is based around a single industry, such as mechanics, coal collection plastic recycling and others (details can be found within the labour statistics that deal with traditional villages).

5.4.3. Until now there is no data on child labour, specifically the number, type of work, and especially the occupational hazards which child labourers are exposed to. It is necessary to create a data collection system for child labour, in which indicators of occupational exposure, occupational injury and health are collected at the national, regional and local levels. In the short-term, the government can call on support from government and nongovernmental organisations to assist in the design of standard recording and reporting tools, as well as to seek more information and statistics on child labour. This should be done in collaboration with the current recording and reporting system and be pilot tested before being implemented throughout the country.

5.4.4. Research intervention models in health and safety promotion in the workplace for child labourers (and possibly for the community in general), using a community participatory approach. The areas for research may be one of the three targeted in this research study, and may be used to inform the development of a data collection and reporting system.

5.4.5. Establish Occupational Health and Safety Standards for child labourers, to include:

- Workload, work burden, and the exposure of children to hazards inside and outside the workplace

- Set up suitable safety thresholds for child labourers. These should not be modified from the adult parameters, but should be designed specifically for children.

5.4.6. As the available research tools and methods have been designed for adults working in state and large enterprises, they are not suitable for research into child labour (especially as it often takes place in small and medium size enterprises). More sensitive tools and methods must be developed to research child labour and the conditions it exists in.

5.5. Strengthening the capacity of the Occupational Health and Safety Care Network

This research study recommends that the Occupational Health and Safety Care Network:

- Increase training for Occupational Health and Safety professionals and inspectors

- Promote the role of professional associations and national and international technical experts, regardless of their affiliation with a government or nongovernmental organization or their status as individuals.

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