



## **National Occupational Safety and Health Profile of Taiwan**

**Occupational Safety and Health Administration  
Ministry of Labor, Republic of China (Taiwan)**

2014.03

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## Preface

Occupational safety and health is the priority to achieve “**decent work- to create a fair and just working environment and to build a dynamic labor market**”. Ministry of Labor of the Republic of China (Taiwan) will continue protecting the safety, health and wellbeing of all workers, and keep OSH performance in line with international advanced level.

The Labor Safety and Health Act has launched in 1974. The Act is amended as the Occupational Safety and Health Act on the July 3rd, 2013 so as to expand the coverage and protection for the labor force.

In order to improve our national competitiveness and to enhance government's performance, the Ministry of Labor (MOL) was newly restructured from the Council of Labor Affairs in the February, 2014, and that is our intention to emphasize the importance of all stakeholders in work. The MOL will make more efforts *to articulate policies on human resources, occupational safety and health, employment conditions, labor insurance and industrial relations, and to **ensure all workers are fully protected**, yet the labor market is dynamic enough to face the rapid change of the global economy.* (Minister Dr. Shih-Wei Pan, the MOL)

MOL establishes the Occupational Safety and Health Administration (OSHA) to plan and manage all national OSH affairs. The OSHA consolidates 3 original OSH relevant agencies of the CLA, which are the entire Department of Labor Safety and Health, the entire Department of Labor Inspection & its three Regional Labor Inspection Offices, and the Occupational Accident Labor Protection Office of the Bureau of Labor Insurance.

This document, based on the mission of OSHA, briefly summarizes its relevant activities and policies. We believe that labor is always the backbone of economic development in every country regardless of which era. We cordially ask you helping Taiwan to create a better work environment for all workers.

The editors  
2014.03

## Abbreviations

AEC	Atomic Energy Commission (a R.O.C. Ministry)
API	American Petroleum Institute
ASIP	The Allied Association for Science Park Industries
ASME	American Society of Mechanical Engineers
BSMI	Bureau of Standards, Metrology & Inspection (of MOEA)
CAS	Chemical Abstracts Service (of American Chemical Society)
CLA	Council of Labor Affairs (a ministry, was structured to become MOL)
CNFI	Chinese National Federation of Industries
CNS	National Standards (managed by BSMI of MOEA)
EOMA	Taiwan Environmental and Occupational Medicine Association
EPA	Environmental Protection Administration (a R.O.C. Ministry)
GHS	Global Harmonized System on Classification and Labeling of Chemicals
G.R.E.A.T.	GHS Reference Exchange and Tool (of APEC)
HazOp	Hazard and Operability Study
HPA	Health Promotion Administration (of MOHW)
ICCA	International Council of Chemical Associations
IDB	Industrial Development Bureau (of MOEA)
ILO	International Labor Organization
IOSH	Institute of Labor, Occupational Safety and Health (of MOL)
ISHA	Industrial Safety and Health Association of the R.O.C, Taiwan
ITRI	Industrial Technology Research Institute
LI	Labor Inspection
Lisu	Labor Insurance
LS	Labor Standards
MIRDC	Metal Industries Research and Development Centre
MOE	Ministry of Education (a R.O.C. Ministry)
MOEA	Ministry of Economic Affairs (a R.O.C. Ministry)
MOHW	Ministry of Health and Welfare (a R.O.C. Ministry)
MOI	Ministry of the Interior (a R.O.C. Ministry)
MOL	Ministry of Labor (a R.O.C. Ministry)
MSDS	Material Safety Data Sheet (same as SDS)
MSDs	Musculoskeletal Disorders
NFA	National Fire Agency (of MOI)
NODIS	Network for Occupational Disease and Injury Services
OA	Occupational Accident
OAC	Occupational Accident Compensation
OAW	Occupational Accident Workers
OAWC	Occupational Accident Workers Compensation
OAWP	Occupational Accident Workers Protection
OD	Occupational Disease
OH	Occupational Health
OHSAS	Occupational Health and Safety Management Systems
OI/D	Occupational Injuries and Diseases
OIDPT	Prevention and Treatment of Occupational Injury and Disease
OS	Occupational Safety
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (of MOL)

PSM	Process Safety Management
R.O.C.	Republic of China
SAHTECH	Safety and Health Technology Center Taiwan
SEMI	Semiconductor Equipment and Materials International
SDS	Safety Data Sheet
SHE	Safety, Health and Environment
SME	Small and Medium-sized Enterprises
TAVOI	Taiwan Association for Victims of Occupational Injuries
TCTU	Taiwan Confederation of Trade Unions
THPGIA	Taiwan Industrial Gas Association
TLF	Taiwan Labor Front
TOHA	Taiwan Occupational Hygiene Association
TOSHMS	Taiwan Occupational Safety and Health Management System
TRCA	Taiwan Responsible Care Association
TSIIA	Taiwan Steel & Iron Industries Association
UN	United Nations



# 1 National Occupational Safety and Health Framework

## 1.1 National OSH Policy and Trend

The setting of Taiwan's national occupational safety and health policy is based on the domestic trend of social economic development and occupational accident, international development trend, ILO conventions and guidelines as well as the practices of global advanced countries.

To ensure everyone a safe, healthy and decent work environment, the main focuses of national OSH policies are (1). to protect the safety, health and wellbeing of all workers at work, including employed workers in all industries, the self-employed and all others whose labor is directed or supervised by a workplace responsible person. (2). to making clear the OSH responsibilities of the employers, designers, manufacturers, importers, suppliers and other related parties. (3). to enhance social dialogue and collaboration among government, employers and workers, and to facilitate social participation of business entities and relevant organizations. (4). to enhance OSH source management of machinery, equipment, appliances and chemicals. (5). to build a complete occupational disease prevention and occupational health service system, especially strengthening the protection of physical and psychosocial health of workers. (6). to enhance the health protection of maternity, youth and ageing workers. (7). to enhance the capacity of labor inspection, increase the inspection of high-risk business entities, and impose penalties consistent with the severity of violation. (8). to enhance occupational safety and health research so as to response emerging risks. (9). to implement systematic OSH risk management and trainings, and to foster OSH culture of all citizens and the development of commercial OSH consultation service sector. (10). to assist vulnerable small and medium-sized enterprises improving work environment. (11). to facilitate the assistance and return-to-work rehabilitation of occupational accident workers.

## 1.2 Regulatory and Standards Setting

Ministry of Labor (MOL) invites employees, employers, public agency representatives, academic experts, and occupational accident labor organizations to convene occupational safety and health consultative committees to examine and discuss national occupational safety and health policies and provide recommendations; and one third of the attendants shall not be less than either gender. Taiwan Occupational Safety and Health Administration (OSHA) deliberates upon the national OSH conditions, occupational accidents, scientific evidence and advanced international trends, to timely compile relevant laws and regulations.

The drafted bill is repeatedly discussed among experts, public agencies, employers (such as Chinese National Federation of Industries, CNFI), employees (such as Taiwan Confederation of Trade Unions, TCTU) and non-profit organizations (such as Taiwan Labor Front, TLF; Taiwan Association for Victims of Occupational Injuries, TAVOI; Taiwan Occupational Hygiene Association, TOHA; Taiwan Environmental and Occupational Medicine Association, EOMA). After numerous public hearings and meetings, the bill is discussed, revised and then issued by the MOL. For the authorization degree, bill related to Laws must be reviewed and passed by the Executive Yuan and then sent for legislative approval. In the review process of Legislation Yuan, interested parties will also express further concerns to the Legislators. The bill passed by the Legislation Yuan will be promulgated by the President.

### **1.3 Law Enforcement Practices**

Through OSHA, some designated agencies of other ministries, and some municipal city governments, MOL strongly enforces labor inspection. Violator could be subjected to shut-down, limited term of imprisonment, criminal detention, or/and fines, in which fines could be up to 3 million New Taiwan Dollars (NTD). MOL may also publish the name of violator, in-charge person or employer.

### **1.4 Economic Models of Regulating Employers' Activities**

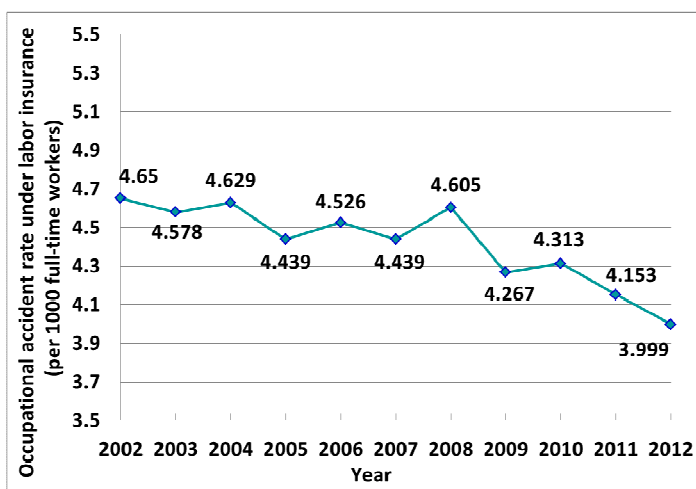
In addition to mandatory labor insurance (including general insurance, pension insurance and occupational accident insurance), employer usually will take in additional employee insurances, such as group insurance, medical and hospitalization insurance, accident insurance, to pay possible additional compensation or condolence. In general, employer must take good care of employees to have better insurance premium. Business entities with factory equipment insurance are also required to well manage the safety and health of employees. Some special processes or sectors are required to have much better OSH performance to hire relatively larger portion of international migrant workers.

MOL provides numerous technical assistance and partial subsidies of OSH installations for SME. Ministry of Economic Affairs (MOEA) also provides low-interest replacement loan for safer processes, machineries, or installations.

### **1.5 National Awards and Activities**

In order to increase occupational safety and health knowledge of employers and workers and promote the development of safety culture, MOL regularly holds national level activities to encourage business entities and related groups to implement OSH, such as national safety day, national occupational health week & safety week, zero accident certificate, advanced OSH awards, excellent public construction OSH award, five star award, national safety award, etc.

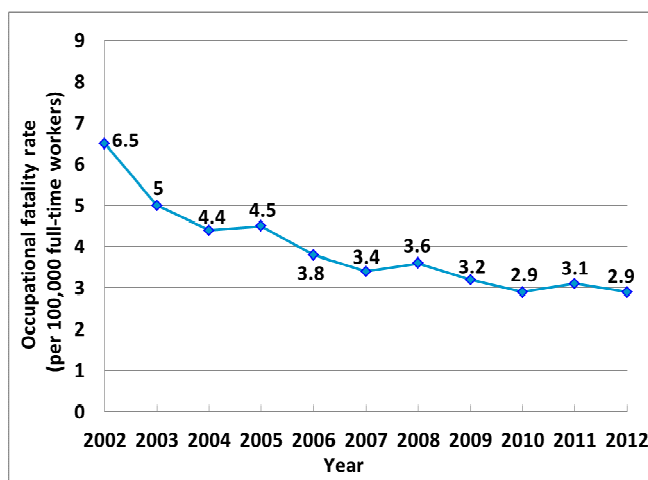
## 2 Statistics on Occupational Injuries and Diseases



**Figure 2.1 Occupational accident rate per thousand full-time equivalent workers in Taiwan (2002~2012)**

(Source: Labor Insurance Statistics.)

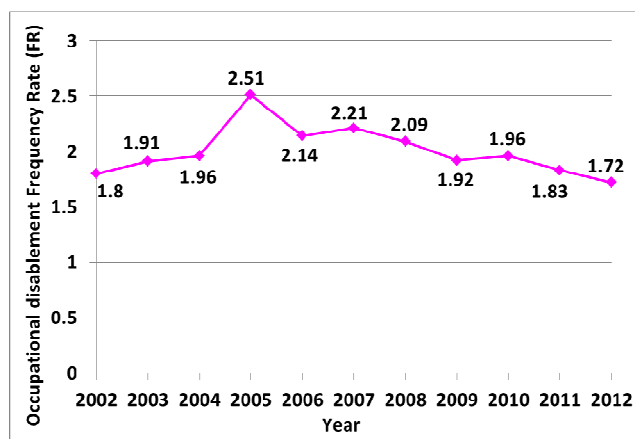
Occupational accident: over three day off-work due to occupational causes, this figure does not include occupational diseases and traffic accidents.)



**Figure 2.2 Occupational fatality rate per 100,000 full-time equivalent workers in Taiwan (2002~2012)**

(Source: Labor Insurance Statistics.)

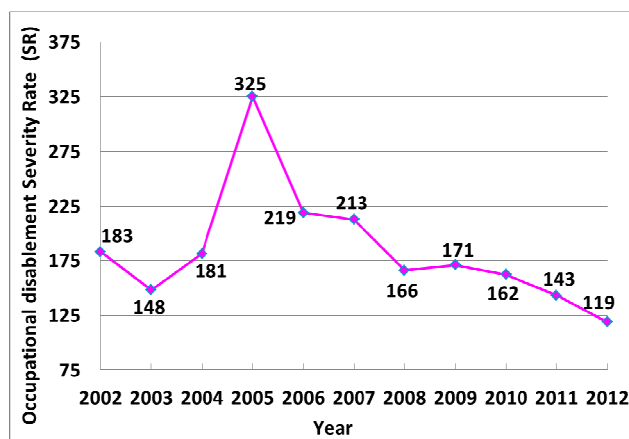
This figure does not include occupational diseases and traffic accidents.)



**Figure 2.3 Occupational disablement frequency rate (2002~2012)**

Frequency Rate (FR) = (number of disablement x 1,000,000) / total work-hours

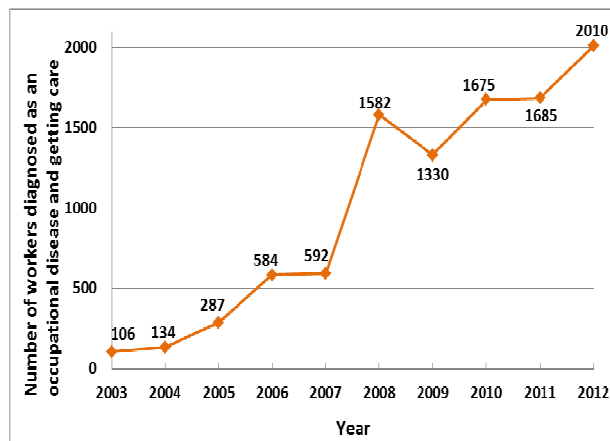
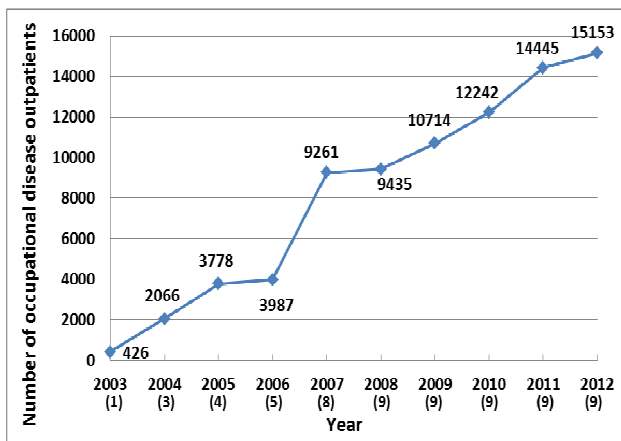
(Source: Labor Statistics Annual Report, including the business entities hiring 50 labors or more as well as entities designated and notified by labor inspection agencies.)



**Figure 2.4 Occupational disablement severity rate (2002~2012)**

Severity Rate (SR) = (lost days x 1,000,000) / total work-hours

(Source: Labor Statistics Annual Report, including the business entities hiring 50 labors or more as well as entities designated and notified by labor inspection agencies.)



**Figure 2.5 The number of occupational disease outpatients**

(Source: Statistics of Centers for Prevention and Treatment of Occupational Injury and Disease, MOL. ( ) denotes the number of OIDPT center. The data excludes the services of general diseases and injuries, occupational needlestick and blood pathogens infection treatment, labor physical and health examination.)

**Figure 2.6 Occupational diseases diagnosed and cared by OIDPT centers**

(Source: Statistics of Centers for Prevention and Treatment of Occupational Injury and Disease, MOL. ( ) denotes the number of OIDPT center. The data excludes the services of general diseases and injuries, occupational needlestick and blood pathogens infection treatment, labor physical and health examination.)

**Table 2.1 Labor coverage of OSH relevant acts**

Item	Labor <sup>1</sup> Coverage
Occupational safety and health act <sup>2</sup>	~95%
Labor insurance act	~95%
Basic occupational health service <sup>3</sup>	~20%
National health insurance <sup>4</sup>	95~99%

<sup>1</sup>total labor force ~10.98M by 2013.09. (Partial labor force is covered by other special acts)

<sup>2</sup>The OSH Act will take effect in 2014; labors covered by Labors Safety and Health Act or Labor Standards Act are ~ 8.4 M in 2013.

<sup>3</sup>Coverage of regular worker health examination required by LSH act (old version of OSH Act) is 95~99%.

<sup>4</sup>If paid insurance fee, all citizens and people live in Taiwan are covered by national health insurance program.

**Table 2.2 List of occupational accident rate by industry sectors in 2012**

Industry Sector	Occupational Accident <sup>1</sup> Rate	Fatality Rate <sup>2</sup>	Disablement <sup>3</sup> Rate	Other Injury <sup>4</sup> Rate
All industries	3.999	0.029	0.282	3.688
Agriculture, forestry, fishing and animal husbandry	1.431	0.079	0.145	1.206
Mining and quarrying	9.273	0.431	0.863	7.979
Manufacturing	4.927	0.032	0.476	4.419
Electricity and gas supply industry	1.544	0.081	0.244	1.219
Water supply and remediation services	6.645	0.071	0.389	6.185
Construction	13.363	0.131	0.668	12.564
Wholesale and retail trade	3.306	0.018	0.206	3.082
Transportation and warehousing	4.505	0.054	0.261	4.190
Accommodation and hospitality	4.228	0.007	0.090	4.131
Information and communication	0.542	0.013	0.030	0.499
Finance and insurance	0.278	-- <sup>5</sup>	0.008	0.270
Real estate	1.408	0.016	0.040	1.352
Professional 、 science and technical services	1.374	--	0.076	1.299
Support services	2.581	0.029	0.135	2.417
Public administration, defense ; compulsory social security	1.027	0.029	0.180	0.819
Educational services	0.605	--	0.043	0.562
Medical insurance and social work services	0.806	--	0.015	0.791
Art 、 entertainment and leisure services	2.905	0.022	0.097	2.787
Other services	2.362	0.008	0.174	2.180

Source: Labor Statistics Annual Report, MOL, 2012; occupational diseases and traffic accidents were not included.

<sup>1</sup>The term “occupational accident” as used in this Profile shall mean any worker injury, disability, or death caused by buildings, equipment, raw materials, materials, chemicals, gases, vapors, dusts, etc., in the place of employment, or as a result of the performance of duties, or due to other occupational causes.

<sup>2</sup>The rate unit of this table is per 1,000 full-time equivalent workers.

<sup>3</sup>Disablement denotes as permanent disablement.

<sup>4</sup>Other injuries denotes as at least three day off-work due to occupational injury.

<sup>5</sup>-- : denotes as 0.000

**Table 2.3 List of occupational accident compensation by industry sectors in 2012**

Industry Sector	no. of Occupational Disease Compensation Payment				no. of Occupational Injury Compensation Payment			
	Others	Disabl ement	Fatality	Total	Others	Disabl ement	Fatality	Total
All industries	601	261	46	908	57,173	3,839	624	61,636
Agriculture, forestry, fishing and animal husbandry	3	6	2	11	580	68	43	691
Mining and quarrying	--	7	--	7	43	5	3	51
Manufacturing	156	116	12	284	19,325	1,722	191	21,238
Electricity and gas supply industry	--	3	--	3	46	7	2	55
Water supply and remediation services	2	1	1	4	512	29	10	551
Construction	128	48	6	182	10,822	599	115	11,536
Wholesale and retail trade	76	18	4	98	9,482	55	90	9,627
Transportation and warehousing	40	16	6	62	2,957	194	55	3,206
Accommodation and hospitality	51	3	1	55	3,432	94	24	3,550
Information and communication	1	2	--	3	451	26	3	480
Finance and insurance	1	--	--	1	672	30	2	704
Real estate	3	4	2	9	534	18	7	559
Professional, science and technical services	3	--	2	5	1,104	59	6	1,169
Support services	14	4	8	26	2,109	104	31	2,244
Public administration, defense ; compulsory social security	3	6	--	9	259	47	14	320
Educational services	5	4	1	10	410	23	1	434
Medical insurance and social work services	32	3	1	36	1,176	44	9	1,229
Art, entertainment and leisure services	2	4	--	6	461	14	5	480
Other services	81	16	--	97	2,798	241	13	3,052

Source: Labor Statistics Annual Report, MOL, 2012

Traffic accidents were not included.

-- : denotes as 0

## **3 Occupational Safety and Health Legal Framework**

### **3.1 Constitution of Taiwan on Working Conditions and OSH**

Article 15: "The right to life, right to work and property of people shall be protected."

Article 153 Section 1: State, enhancing production skill of labors and peasants so as to improve their life, should develop protection laws of workers and peasants, and implement relevant policies. Section 2: Women and children engaged in work, according to their ages and physical conditions, should receive special protection.

Article 154: Employers and employees should cooperate to develop business. Mediation and arbitration of labor dispute should be regulated by laws.

Among those, Article 153 is directly related to the occupational safety and health.

### **3.2 Main Laws on OSH**

#### **3.2.1 Occupational Safety and Health Act**

The Occupational Safety and Health Act was promulgated on April 16, 1974 and was fully amended in 2013. The Act is applicable to all workers, including employed, self-employed and all others, such as contractors or interns, whom are directed or supervised by a workplace in-charge person. The number of protected persons are over 10.9 million. The responsibilities of the employers and the safety responsibilities of manufacturers, importers and other related parties are all made clear. The Act covers general responsibility of employers, machinery safety, chemical hazard communication & exposure assessment, occupational health protection, maternity and youth worker protection, OSH management, contractor and subcontractor management, severe occupational accident notification, monthly occupational accident statistics, supervision & inspection, penalty, etc.

Work assigned to laborers by the employer shall be within a reasonable and feasible scope, with necessary preventative equipment or measures taken to prevent laborers from being involved in occupational accidents. The employer shall have the necessary safety and health installations in conformity with OSH laws and regulations. Those involved in the design, manufacture, or import of items such as machinery, equipment, tools, raw materials, and materials, as well as those engaged in the design and construction of engineering projects shall carry out risk assessments during the design, manufacturing, import, or construction planning phase, and make efforts to prevent the occurrence of occupational accidents during the usage of such items or project construction.

Machinery, equipment and appliances designated by the MOL shall not be manufactured or transported out of the factory or imported if neither meet safety standards nor been certified. Manufacturers or importers should publicize those machinery, equipment and appliances by means of registration and safety label. Designated dangerous machinery and equipment should be operated by qualified person, and regular risk assessment should be conducted for chemical processes with potentially severe consequence.

Business entities should implement their own OSH management, and should provide all workers with OSH education and trainings necessary to perform duties and to prevent accidents. When business entity consigns work to other contractors, the

contractors shall assume, to the extent of contracted proportion, of the employer liability in accordance with the OSH Act. The original business entity and the contractors still take joint liability for claims resulting from occupational accidents.

The OSH Act stipulates the evaluation, authorization and future-reference management mechanisms for new chemical substances, controlled chemicals and priority-management chemicals. The act adds the obligations to manufacturers, importers, suppliers or employers for providing or disclosing safety data sheet, preparing inventory list and implementing trainings and education for workers with hazardous chemical operations. In accordance with intrinsic hazards, utilization quantity and dispersion degree, business entities are mandatory to assess exposure risk of workers and implement suitable control banding management measures.

Business entities are required to prevent workers from over-fatigue, mental stress and musculoskeletal disorders. Especially for the work related diseases brought on by long working hours or over abnormal workload, illegal infringement of mind or body, repetitive work, and other matters, business entities should implement appropriate plans and necessary measures. Employer are prohibited to have laborers working in a high temperature worksite for more than six hours each day. Reduction of working hours shall also be applied for laborers performing work under abnormal air pressure conditions, work at heights, precision work, heavy physical work, or other operations posing special hazards to labors, and appropriate rest periods shall be given during those works.

When the number of workers over 50, designated business entities are mandated to hire or contract medical professionals to carry out worker health management, occupational disease prevention, health promotion and other worker health protection programs. Some specific types and scopes of dangerous or harmful works that less than 18 years old workers, women, pregnant women or who have given birth within a year are prohibited to engage, respectively. Designated business entities should adopt hazard assessment, treatment, and control banding measures with respect to work that could be a threat to maternity health. With respect to pregnant women or women who have given birth within a year, work adjustment or specific health protection measures should be adopted.

Employer should co-work with union or worker representatives to set appropriate OSH codes of practices. If employee finds business entities violating the Act or other OSH regulations, or suffered from suspected occupational disease, or subjected to workplace violence, such could appeal to employer, competent authority or labor inspection agency. To ensure the causation between diseases and works, or the employer' measures for preventing and treating workplace violence, the competent authority or labor inspection agency may conduct investigation. If necessary, litigant, union or relevant persons may be invited to join the investigation. Employer is prohibited to dismiss, transfer or unfairly treat with such worker who files the complaint.

When on-duty worker finds an immediate danger and, such worker, without endangering the safety of other workers, may retreat to a safe place and reports to his/her line manager. Employer are prohibited to unfairly treat with such worker. MOL may also publish the business entities name of violator or severe occupational accident



so as to improve supervision by public pressure. In the event that an occupational accident occurs at the worksite of a business entity, the employer shall immediately take necessary measures such as first aid and emergency rescue, and conduct an investigation and analysis of the accident in consultation with labor representatives, and make records of such. The employer shall notify a labor inspection agency within eight hours of the occurrence of major occupational accidents occurs at the work site.

MOL and labor inspection agencies may carry out inspections of business entity worksites. Those not conforming to regulations shall be informed of the law clauses breached and required to make improvements within a given limited time period. Those failing to make improvements within the specified period of time, which have already had occupational accidents, or which have the potential for occupational accidents to occur may be notified to suspend all or part of their operations.

### **3.2.2 Labor Inspection Act**

The Act is enacted to implement labor inspection, enforce labor laws and regulations, protect the rights and interests of employees and employers. The scope of labor inspection includes the enforcement of this Act, Labor Standards Act, Occupational Safety and Health Act and other labor laws & regulations, including process safety management, dangerous machinery/equipment inspection, management of designated inspection agency, inspection procedures, etc.

Labor inspection is conducted by the OSH centers of OSHA, but some regions are conducted by municipal governments or special agencies of some ministries from the empowerment of the MOL. When necessary, the OSH center may conduct joint inspection with the county/city government. If deemed necessary to shut down the workplace in order to prevent further fatality or injury, the labor inspector(s) shall notify the business entity in writing and order partially shut down or completely shut down.

Upon receiving a complaint from worker(s), labor union shall review and verify worker's complaints, then gives suggestion to the complainant's employer and also send a copy to the labor inspection agency and the complainant(s). When the business entity rejects the suggestions prescribed above, the union may appeal to the labor inspection agency for requesting an inspection. Where a contravention has not been rectified by the established compliance date and an occupational fatality or injury may occur, the labor inspector shall report to the labor inspection agency. When necessary, the labor inspection agency shall notify the business entity to partially shut down or completely shut down the workplace.

### **3.2.3 Occupational Accident Labor Protection Act**

MOL prepares and allocates (1) the surplus of the incomes and expenditures of the occupational accident insurance program of the Labor Insurance Fund, (2) special budget fund and (3) administrative fines for the expenses of this Act. Workers, not participated in the labor insurance, are also receiving financial subsidy from the MOL, if suffered from occupational accidents. Business entities, independent contractors and subcontractors shall be jointly responsible for compensatory liability for occupational injuries and diseases (OI/D).

The recognition and identification process of occupational diseases is also set forth in this Act. MOL establishes a Committee on Occupational Diseases Identification, consisting of occupational disease physicians (at least 50 % of committee members), experts of occupational safety and health or law, and representatives of MOL and MOHW. Before OI/D determination, workers may apply for leave for general injuries and diseases. After the determination, they are entitled to be treated as injuries and diseases arising from public duties. For those workers suffered from OI/D who have terminated their labor contracts during medical treatment and withdrawn from the Labor Insurance program, they may apply for continuing their insurance coverage. Their insurance premium shall be subsidized fifty percent by the Special Fund for the Occupational Accident Labor Protection.

Business entities, vocational training institutions and relevant groups may apply for subsidies from the Bureau of Labor Insurance to conduct prevention or rehabilitation affairs related to occupational accidents. Upon the termination of medical care for a worker suffering an occupational accident, MOL may provide employment assistance to the worker concerned according to his/her willingness and capability to work. For those who are willing to return to their original entities, their employers shall accommodate suitable work and provide assisting facilities for them. When hiring workers suffering occupational accidents and providing them with necessary auxiliary facilities to work, business entities may apply for subsidies from the Bureau of Labor Insurance. For those who are in lack of job skills, MOL may help them take vocational training and assist him/her to return to the employment place at the earliest time possible. For those still suffered mental or physical disorders, the local competent authority shall inform the local social affairs to authorities actively provide assistance.

#### **3.2.4 Labor Insurance Act**

The coverage of Labor Insurance is categorized as 1.General insurance (including maternity, injury or diseases, disability, old-age and death benefits) and 2.Occupational accident insurance (including injury or disease, medical-care, disability and death benefits). Workers over 15 years old and below 65 shall all be insured under this program as insured persons, with their employers, organizations or unions to which they belong reckoned as the insured units. The insurance premium is calculated using the insured person's monthly insurance salary and insurance premium rate, including general insurance premium rate and occupational accident insurance premium rate (OAR). The OAR, adjusted every three years, includes business category accident premium and on-off duty accident premium.

#### **3.2.5 Labor Standards Act**

The Act is enacted to provide minimum standards for working conditions. Employer shall take precautions for the safety and benefit of employees against occupational hazards, create proper working conditions and provide welfare facilities. Original business entity shall supervise the contractor or subcontractor to provide their workers with such labor conditions as prescribed in the Act.

The Act covers labor contract, wages, working hours & their distribution guideline, child worker(over 15 years old, but less than 16) protection, female worker protection, apprentice protection, gender equity, retirement & its payments, compensation for occupational accidents & the receiving order of survivor compensation, work rules, etc.

A worker shall not have regular working time over 8 hours per day and 84 hours in 2 weeks. With the agreement of labor union or labor-management meeting, if there is no labor union in a business entity, employer may extend regular working hours to 12 per day, but the overtime work shall not exceed 46 hours per month. For the overtime work, worker can choose compensatory rest hours instead of overtime payment.

Female worker shall be granted maternity leave, with payment, before and after childbirth for a combined period of 8 weeks. Where a female worker is required to breast-feed her baby of less than one year of age, and the employer shall permit her to do so twice a day, each for thirty minutes. The breast feeding time shall be deemed as working time. Worker may take parental leave when his/her child is less than 3 years old, and he/she is liable to receive allowances form Labor Insurance fund if has been insured over a year.

### 3.3 Key OSH by-laws

The OSH by-laws are listed in Annexes F.

**Table 3.1 Key phrases of relevant OSH regulations**

Category	Key Phrases of Regulations, Rules and Standards
1. General occupational safety and health	OSH enforcement, safety and health installations, OSH management, risk assessment, self inspection, pregnancy workers, female workers after giving birth less than a year, youth workers, female worker working in night shift, incentives and awards for promoting OSH, etc.
2. General workplace management	process safety management, workplace monitoring, oxygen deficiency prevention, OSH labelling, etc.
3. High pressure gas	worker safety for handling high pressure gases.
4. Health management	health examination body management, worker health protection, occupational disease prevention, etc.
5. Education and trainings	worker OSH education and trainings
6. Chemical substances	hazard labelling and communication, permissible exposure levels, intoxication prevention, specific chemical substances, organic solvents, lead, tetra alkyl lead, dusts, etc.
7. Mechanical safety	general safety protection of machine and equipment, type inspection and verification, dangerous machinery and equipment inspection, designated inspection agency, crane, lift, boiler, pressure vessel, industrial robot, etc.
8. Specific operations	abnormal atmosphere pressure, work at height, work at high temperature, precision vision work, etc.
9. Targeted industrial sectors	construction, harbor loading and unloading, ship tanker cleaning and dismantling, forestry, mining, etc.
10. Occupational accident protection	occupational accident labor protection enforcement, subsidy and granting, labor insurance during medical care, occupational accident prevention, worker rehabilitation, return to work, etc.
11. Others	labor inspection enforcement, factory act enforcement, imminent dangers, work related injuries and diseases, etc.

### 3.4 Other Laws or Standards relevant to OSH

**Table 3.2 OSH related laws of other ministries**

Laws or Standards	OSH Related
1. National Standards & Commodity Inspection Act (MOEA)	The national Standards include standards, testing protocols and/or certification requirement for personal protective equipment, machinery, electricity, chemical labeling and classification, laboratory management, OSH management system, risk assessment, etc. The BSMI of MOEA also utilizes the Commodity Inspection Act to ensure compliance of commodities with the requirements set out in the safety, health, environmental protection, and other technical regulations or standards; to protect consumers' rights and interests; and to promote sound development of economic activities. Some OSH equipment and appliances are inspected by the Commodity Inspection Act.
2. Electricity Act (MOEA)	The electric material, part, equipment, system and their wiring of workplace must follow this Act, especially the house cable wiring rules.
3. Fire Services Act & Firework and Firecracker Management Act (MOI)	The Act includes fire prevention, rescue operation and first aid. Public hazardous substances, fireworks and flammable pressurized gases shall be safely handled including the storage and disposal once reached specified quantities. Fire doors and fire escapes of workplace should follow the regulations of building codes and fire codes.
4. Toxic Chemical Substances Control Act (EPA)	The Act includes the emergency response for chemical accident, and toxic chemical inventory and reporting. Seven national emergency response teams are operated. The chemical classification and labeling of this Act also harmonizes with MOL and follows national GHS standards (of BSMI, MOEA). The Act also strengthens the cooperation of EPA and MOL to implement national chemical management scheme.
5. Indoor Air Quality Control Act (EPA)	The concentration of air pollutants and air humidity of indoor workplace must also follow the Act.
6. Tobacco Hazards Prevention Act (MOHW)	Indoor workplaces are mandated to completely prohibit smoking if jointly used by three or more persons. The Health Promotion Administration of MOHW also works with OSHA of MOL collaboratively to promote healthy workplace and occupational health.
7. Ionizing Radiation Protection Act (AEC)	Ionizing radiation workers or self-employed persons who frequently engage in practice and are aware that they may be subject to exposure should follow the Act.
8. Mine Safety Act (MOEA)	The Act includes mine safety management, investigation and inspection.

## 4 Competent Authorities on Occupational Safety and Health

The national OSH collaboration scheme of employees, employers, public agencies and relevant organizations is shown on Figure 4.1. The Ministry of Labor (1987~2013 as Council of Labor Affairs; 1949~1987 as the Labor Department, Ministry of the Interior) is the central competent authority of national occupational safety and health.

As a subsidiary agency of the MOL, OSHA is obligated to the formulation and execution of occupational safety and health policies. The tasks of OSHA include planning and executing occupational safety and health, occupational accidents labor protection, labor inspection and supervision, and something their related. Its visions are to provide every workers with safety, health, and decent workplaces, to improve the access to competent services of the diagnosis of occupational diseases, occupational compensation and rehabilitation, and to ensure safe and healthy workforce to enhance national competitiveness.

The inauguration of OSHA represents a milestone of our national occupational safety and health work. It vertically integrates planning of the occupational health and safety policies and executions, which strengthens the function and efficiency of occupational accident prevention, speeds up the reduction of occupational accident rates, increases the occupational health and care rates, and ensures workers' health and safety. Also, by means of further horizontal integration of "Prevention, Compensation, and Rehabilitation", to bring into the diagnosis of occupational ailments, investigation of occupational diseases, workers' compensation for occupational accidents and rehabilitation, to strengthen the rights and interests of the victims and to fulfill the goal of national occupational safety and health policies.

Some parts of regional labor inspection are empowered to special agencies of some ministries (such as the Science Park Bureau of Ministry of Science & Technology and the Export Processing Zone Administration of MOEA) and some municipal city governments. MOL also sets up Institute of Labor and Occupational Safety & Health, Bureau of Labor Insurance and Workforce Development Agency to facilitate OSH related affairs, such as research, assistance, training, and the insurance, compensation and statistics of worker general and occupational accidents.

### 4.1 Occupational Safety and Health Administration

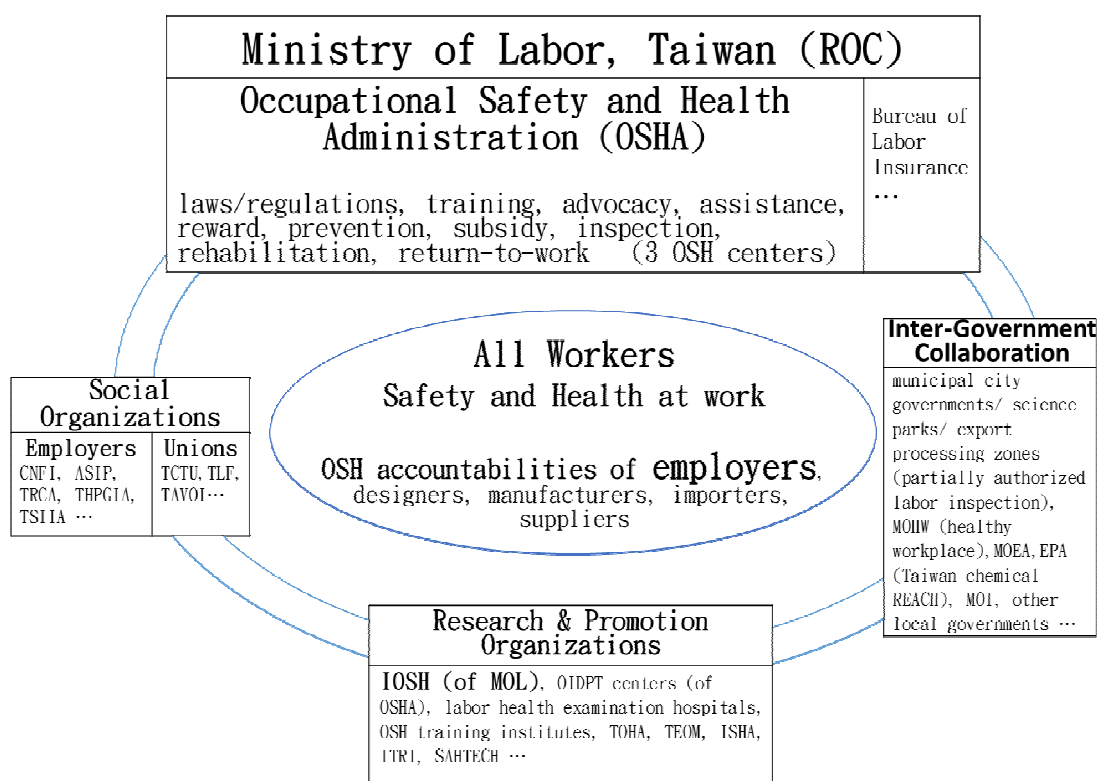
The organization chart of OSHA is as Fig. 4.2. It comprises of three divisions- Planning and Occupational Health Division, Occupational Safety Division, and Occupational Accident Labor Protection Division, and three regional centers- Northern, Central, and Southern Occupational Safety and Health Centers. The primary functions of OSHA are:

1. Plan occupational safety and health policy; formulate, amend, repeal, and interpret related regulations.
2. Plan labor inspection policy; formulate, amend, repeal, and interpret related regulations.
3. Plan occupational accident worker protection policy; formulate, amend, repeal, and interpret related regulations.
4. Plan, implement, and manage occupational safety and health system.
5. Promote, implement, and oversee inspections of occupational safety and health and labor conditions.

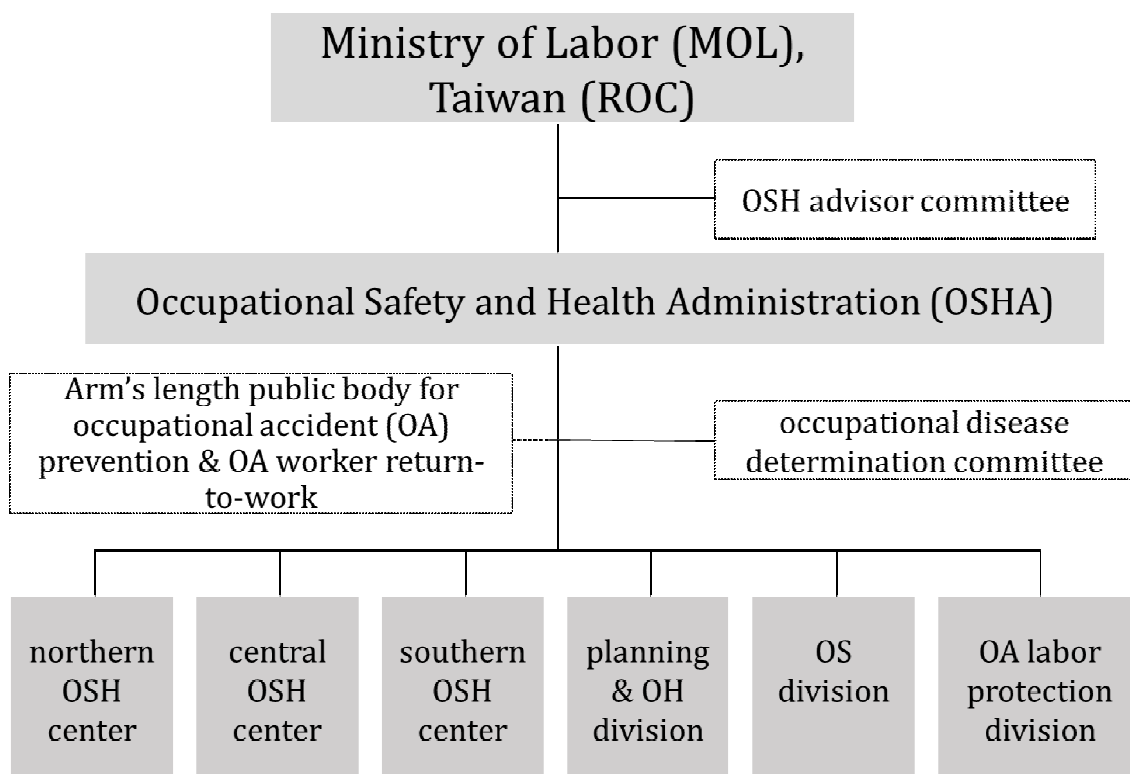
6. Advance and manage the promotion of worker health, the investigation and evaluation of occupational diseases, and the prevention and treatment of occupational injuries and diseases.
7. Advance oversee, and manage occupational management prevention; assist and rehabilitate workers affected by occupational accidents.
8. Other matters related to occupational safety and health, labor inspections, and the protection of workers involved in occupational accidents.

The intervention strategies of OSHA fostering business entities to take OSH fully responsibility include advocacy, compliance assistance and inspection. Except empowered agencies, OSHA accounts for national labor inspection. The types of inspection include labor conditions inspection, OSH special inspection, cross inspection, labor complaint inspection, occupational accident inspection and general inspection. OSHA also increases presence in the workplace. Except the necessary inspection candidates, 20% of year list must be the entities either new or not been inspected within 5 years. The trend of occupational accident rate has continuously decreased in recent 10 years due to the effectiveness of numerous national accident prevention programs. By means of advocacy and training, OSHA educates front-line workers and SME to enhance accident prevention knowledge. OSHA also promotes Safety Partnership to collaborate with business entities, organizations and other government agencies for leveraging limited resources to prevent occupational risks, injuries and diseases.

In the middle of year, OSHA publishes next-year inspection focuses and last-year annual inspection report. The MOL minister and deputy ministers also frequently lead occasional site-visits with relevant agencies and/or local governments to emphasize OSH and to foster the safety culture of business entities.



**Figure 4.1 Taiwan national OSH collaboration scheme**



**Figure 4.2 Organization chart of MOL OSHA**

#### 4.2 Inter-Ministry Collaboration

In addition to empowered agencies, MOL closely cooperates with other ministries, such as the IDB and the BSMI of Ministry of Economic Affairs, the HPB of Ministry of Health and Welfare, Environmental Protection Administration, Ministry of Transportation, the NFA of Ministry of the Interior, Ministry of Defense, Ministry of Education, to upgrade the workplace OSH performance.

## 5 National Occupational Safety and Health Programs



**Figure 5.1 National OSH major programs**

### 5.1 OSH Self Management

Required by OSHA, business entities should evaluate workplace risk, implement OSH self-management, enhance OSH communication and management of contractors, and promote safety culture.

Business entities with more than 30 workers are mandated to set up OSH management staff(s). With more than 100 labors worked at significant risk, or with more than 300 labors worked at medium risk, business entities are mandated to set up a first level OSH management commission directly supervised by employers, as well as employ management personnel who work as full-timers with specific duties. OSHA also publishes "Risk Assessment Technical Guidelines," which include three parts, hazard identification, risk assessment, and risk control. Business entities are encouraged to select an appropriate risk assessment sheet and have it modified depending on the needs and the number of workers.

OSHA requires designated business entities which employ 100 or more workers, or at high risk as priority to introduce Taiwan Occupational Safety and Health Management System, TOSHMS. Incorporating key principles from ILO-OSH:2001 and OHSAS 18001:2007, OSHA establishes and publishes guidelines for TOSHMS along with voluntary certification standards and guiding principles. Any business entity that passes TOSHMS certification is qualified to obtain the certificates of TOSHMS and OHSAS 18001, and waive of OSHA's scheduled inspection.



Since TOSHMS certification scheme was first launched in June 2008, OSHA has approved 12 TOSHMS notified bodies. Auditors, with mandatory OSH certifications and experience, are trained and evaluated annually by OSHA. The auditing reports of designated notified bodies are regularly reviewed and compared in peer. The three audited requirements as of operational control, hazard identification/risk assessment/determining controls and performance measurement/monitoring roughly accounted for 35%, 16% and 7% of the nonconformity and recommendation items respectively in recent years. Moreover, OSHA regularly visits some of TOSHMS entities as to foster the improvement of management system. By December 2013, there were 801 business entities voluntarily obtained TOSHMS certification. Safety of 745,000 workers is further secured and the number is still increasing.

In 2011, the Bureau of Standards, Metrology and Inspection (BSMI) issued Chinese National Standards of Occupational Safety and Health Management System, which included OSH management system requirements (CNS 15506) and OSH management systems guidelines (CNS 15507). MOL then set CNS 15506 as TOSHMS certification standard in the August of 2012.

Specific business entity or its corporate-wide with employees respectively more than 100 or 500 shall establish an OSH management commission, and shall have OSH full-timers and supervisors. If business entity or its corporate-wide have taken into account of TOSHMS guidelines, established and adopted management systems, resulted in qualified management performance with recognition of OSHA, the requirements of “full-timers” and “with specific duties” on OSH management committees and OSH supervisors could be waived. However, the other OSH personnel shall still work as full-timers. This performance recognition is a voluntary program for those entities, with or without TOSHMS or OHSAS certificates, equipped with good OSH management system and records. The certificate of good OSH management performance recognition is from 1 to 10 years.

By utilizing the ISSA questionnaire of year 2012, survey results indicated that business entities commonly value OSH as essential for the company sustainability, but the company-wide cross-department supports for implementing OSH programs and actions are commonly neutral in 2013. The OSH advocacy and safety culture promotion need further efforts to improve.

## **5.2 Chemical Registration, Labeling, Communication and Management**

Based on United Nations' GHS, Regulations of Labeling and Hazard Communication of Dangerous and Harmful Materials was amended and enforced in 2008. Nationally consistent classification and labeling of chemicals in workplace is announced according to national standards. Employers are required to provide labeling of hazardous material and MSDS for workers, as well as relevant communication programs and measures. Safety and health notice should be clarified. OSHA adopts new chemical substances source control and registration, and handling quantity mechanism for Priority Chemicals Substances. Chemicals in the List of Controlled Chemicals, designated by MOL, shall not be manufactured, imported, supplied, or provided for storage or use. So far approximate 4,000 examples of MSDS are provided. National existing chemicals inventory contains 79,000 substances, which covers 19,000 substances possessing GHS hazards and 3,900 priority chemical substances.

In order to actively promote GHS, OSHA holds awareness promotional activities, provides train the trainers programs, produces labeling and MSDS examples, compiles e-newsletter, develops expert system for compounds classification, delivers educational training tools, and offers telephone consultation service. Combined with Control Banding of UN International Labor Organization and GHS hazard classification system, Taiwan chemical control banding tools are designed for the purpose that domestic companies can make it as reference of risk identification, assessment and control.

GHS bilingual (Chinese and English) website with visitors over 320,000 from 2008 to 2013, are currently used by 40,000 company members or more every month. Quarterly e-newspaper readers are over 35,000. Inspection agencies of OSHA has carried out closer inspection and offered help desk service to fully implement GHS since 2010 January.

### 5.3 Exposure Assessment and Control

Standards of Permissible Exposure Limits of Airborne Hazardous Substances in Workplace regulates more than 490 chemical substances, and sets PEL-Time Weighted Average (PEL-TWA8h), PEL-short term exposure limit (PEL-STEL), and PEL-Ceiling. Some of the substances have skin notation or cancer notation. In addition, stresses such as noise, heat and blood lead also have permissible limits. Based on scientific evidence and local exposure data, Institute of Labor, Occupational Safety and Health (IOSH) regularly invites experts and scholars from relevant fields to set the recommended exposure limits (RELs), and those RELs are set as the reference for OSHA's future revision. To issue or amend the finalized permissible exposure limits OSHA might balance the cost of benefit by considering the economic impact to the industry.

Following scientific results recommended by IOSH, OSHA officially publishes workplace monitoring recommendation methods for sampling, analysis and direct reading measurement. Workplace monitoring is required to be carried out by certified personnel based on exposure monitoring plan. Requirement needs to be fulfilled that business entities shall propose monitoring plans of similar exposure group, worker physical and chemicals exposure statues including worst case exposure and non-routine operations. Employers should inform workers of monitoring results and accordingly improve exposure risk of workplace.

In addition employers should commission certified workplace monitoring bodies or industrial/mining hygienists to conduct the monitoring. Monitoring arrangement should be registered in OSHA web reporting system 24 hours before the monitoring. The results should be likewise noted on the reporting system. Analyses should be carried out by accredited laboratories except for designated measurement by direct reading instruments. Accredited laboratories have to participate in and pass the national industrial hygiene proficiency analytical testing (PAT) quarterly, achieves national standard of CNS 1702 or ISO/IEC 17025, and accreditation program published by OSHA.

According to Ministry of Examination, industrial/mining hygienists are 350 between 1987 and 2012. By the statistics of MOL in year 2012, number of class A chemical-factor workplace monitoring specialists is 197 and class B is 710. Meanwhile, for physical-factor workplace monitoring, the number of class A certificated specialists is 40 and class B is 412. In 2011, there are 100,000 samples been monitored, involving 32 monitoring bodies and 90 workplace monitoring specialists (including 60 certificated industrial/mining hygienists) and 12 accredited industrial hygiene laboratories.

The employers are mandated to keep worker exposures under the permissible limits. OSHA conducts quality program of workplace monitoring affairs to upgrade the skills and service quality of certified workplace monitoring bodies or industrial/mining hygienists. Nationwide industrial hygiene exposure survey and health hazard evaluation are also conducted to update workers' exposure scenarios.

OSHA also encourages and promotes certification programs of exhaust ventilation effectiveness and personal protection equipment effectiveness. Both programs set up standard testing protocols, testing laboratories, product after-market management schemes and the amendment of national standards so as to upgrade the quality of product manufacturers, to inspect the function performance of products (including imported), and eventually to protect workers from health hazard exposures. Indoor chemical operation workplace is required by laws to have sufficient fresh air changes for workers, according to the airborne exposure hazards of specific chemicals. In addition warning and prevention measures for corrosive chemicals and chemical fire/ explosion are also mandated. OSHA also conduct seminars to disseminate best practices in compliance with such regulations. OSHA and IOSH also conduct practice programs and researches to protect workers in nano particle operations, and numerous alerts and guidelines are published.

#### **5.4 Occupational Health Service and Diseases Prevention**

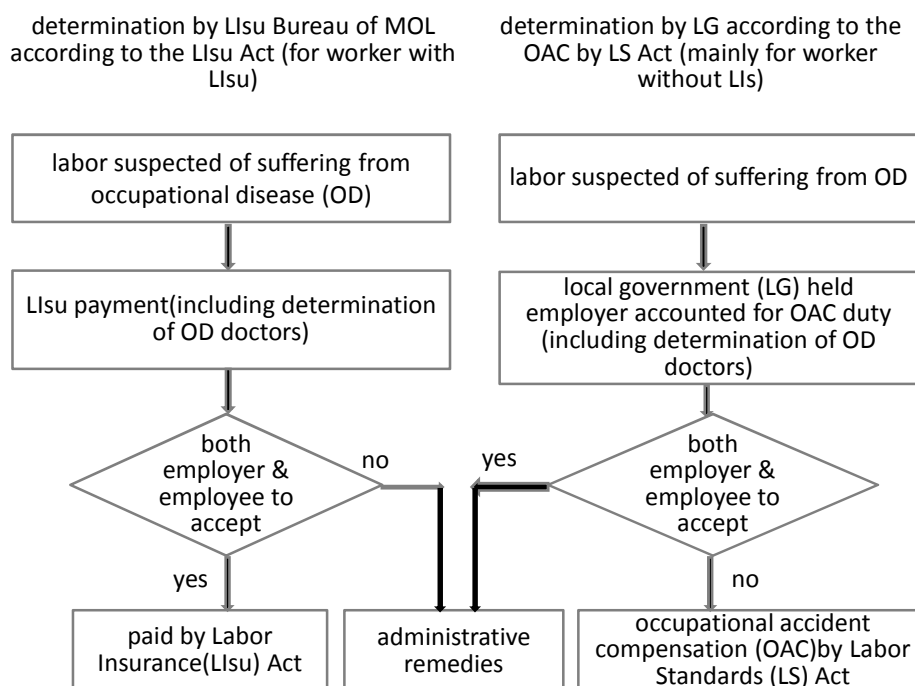
Along with national health insurance and healthy workplace programs promoted by Ministry of Health and Welfare (MOHW), MOL OSHA requires employers to conduct an employee medical examination before hiring, as well as regular post-offer health examination for workers. Health management data should be collected and managed for workers engaged in operations particularly harmful to health, together with four graded health management. MOL collaborates with MOHW on relevant health activities of assignment and management of labor health examination hospitals, training of occupational disease physicians and occupational health nurses, and workplace health promotion.

In 1995 MOHW adopted occupational disease reporting systems. From 2003, year after year OSHA encouraged large medical centers to set up centers for prevention and treatment of occupational injury and disease (OIDPT centers). In 2007 a service center for OI/D management was built by OSHA to standardize operation and quality of the nine OIDPT centers. In 2008 OSHA and regional network hospitals took over and run the reporting systems for OI/D. Workers could therefore receive services in nearby neighborhood, such as occupational disease prevention, identification of causal relation between factors at work and disease, return to work evaluation, referral to vocational rehabilitation, and consultation of compensation laws. SME are encouraged to take on-site health service that medical professionals and industrial hygienists help with risk assessments, occupational disease prevention and health promotion. Additionally OIDPT centers offer outpatient service, which later covers occupational burnout and health consultation for maternity women.

The occupational services of 9 OIDPT centers and NODIS clinics increase every years, as shown on Figures 2.5 and 2.6 (the data excludes the services of general diseases and injuries, occupational needlestick and blood pathogens infection treatment, labor physical and health examination ). The outpatients were 426 persons in year 2003, 3,492 in 2009, and 15,153 in 2012.

OSHA in conjunction with occupational medicine associations and related institutes holds training programs and conferences for occupational disease physicians and labor health examination physicians. The topics cover (1) prevention, identification, recognition and review system of occupational diseases, (2) work-related burnout, mental disorders and behavior disorders, (3) occupational violence, (4) occupational health service for female or ageing workers, (5) control banding for the labor health examination of special health harmful operations, (6) labor psychological counseling, and (7) health promotion. Figure 5.2 shows the schematic processes of occupational disease determination. OSHA also works with relevant nurse associations collaboratively to hold practical training programs upgrading the capacity of occupational service nurses.

For those workers who are covered by the Labor Insurance Act and are suffered from occupational injuries and diseases, in addition to receiving various labor insurance occupational accident payments as stipulated in the Act, they are also entitled to apply for living allowance and subsidies. For those workers who are not covered by the Labor Insurance Act and are suffered from OI/D, if they died or seriously impaired by OI/D and their employers have not paid workers' compensations in accordance with the related statutes, the workers themselves or their survival may apply for grants for disabilities or deaths.



**Figure 5.2 Occupational disease determination schematic processes**

Moreover, musculoskeletal disorders, MSDs accounts of 33% for all the occupational diseases in Taiwan in recent years. MSDs takes place because of poor design of workplace that are unable to fit worker's size, shape and posture. As a consequence unnatural, difficult, counterproductive work postures and movements occur and lead to cumulative MSDs. Workplace improvement programs through ergonomic intervention and research studies of MSDs risk prevention have been introduced by IOSH for many years. IOSH also develops "Ergonomics Prevention Guidelines for Musculoskeletal Disorders," and standardized

workplace improvement checking flowchart, graphic SOP working sheets, and related tools. Awareness promotion activities are held to help business entities reduce risk of MSDs. By statistics, 80% of improvement cases spent under 10,000 NTD and worker complaints are reduced by 20% to 60%.

## 5.5 OSH Training

Employers are required by OSHA to provide all their workers with OSH education and trainings for work-related accident prevention, and have related qualified workers for specific designated operations. International migrant workers are also received necessary OSH trainings in their mother languages. And such education and trainings are obligatory for workers. In the same manner, OSHA encourages non-profit organizations, employer associations, labor unions and business entities to establish training institutes. If the education and trainings are open to the general public, such non-profit organization, employer association, labor union shall conduct education and trainings in its own vocational training institute approved by law. So far there are 300 training institutes providing more than 60 required OSH vocational skills, and more than 160 training institutes are open to the general public. In 2012 number of classes reached 5,020, and 143,000 workers received training.

OSHA also entrusts professional institutes to establish hands-on practice protocols and conduct assessment for OSH education and trainings of training institutes. Training institutes should submit annual self-assessment report, and some of them will receive on-site assessment. Training institutes also can voluntarily apply for assessment. Control banding protocols are applied for those that have excellent assessment results will be allowed to expand their services, while that fail will be revoked for offering such education and training programs.

OSHA management specialists (including occupational safety management specialist, occupational health management specialist and OSHA management personnel) are certified by national tests, including choice and essay questions. Those fulfill the qualification, either with the training completion certificate of qualified training institute or with university diploma of related OSHA departments or programs, can attend the MOL test to have such OSHA management specialist certificates if pass the test.

A system of "separate testing and training" was adopted gradually. In other words, instead of written tests conducted by individual training institute, MOL has gradually moved all post training tests to standardized computer based format with immediate test results since 2013. It gives test takers immediate exam results and passing certificates from training institutes, such as the class-1 managers of OSHA affairs. Additionally computer based tests require accommodations approved by MOL.

By statistics between June, 2011 and May, 2012, the top three categories of workers trainings, including required skills, qualification and knowledge by the OSHA regulations, was 30.6% taken for obtaining professional techniques. 22.0% was for occupational safety and health. 10.6% was for communication and human relationship.

## 5.6 Machinery and Equipment Safety

MOL encourages business entities to use intrinsic safety machinery, equipment and tools. For strengthening the prevention of occupational accidents and rehabilitation of occupational accident workers, MOL sets grant projects to assist business entities and

relevant groups promoting mechanical intrinsic safety systems so as to improve OSH conditions. Business entities, vocational training institutions and relevant groups handling the matters, including improvement of safety and health facilities, establishment of management systems, and promotion of intrinsic safety systems of machinery, may also apply for subsidies from the Bureau of Labor Insurance.

To emphasize the safe use and responsibility of manufactures and importers, machinery, equipment and appliances designated by OSHA cannot be manufactured or transported out of the factory or imported if not meet safety standards or not been certified. Beside the general safety requirements, designated machinery, equipment and appliances that has not been announced as type testing certified and meets the requirements of safety standards, manufacturers or importers should publicize it by means of registration and safety mark (TS mark). Such designated machinery, equipment and appliances include power punching machine, power forklift, hand planer, circular saw for wood processing, grinding machine or wheel, and explosion proof electrical equipment, etc. In addition, any special machine or equipment, designated by OSHA, posts potential severe hazards to the workers is mandated to individually fulfill special safety inspection before use, and have to pass regular inspection.

Moreover, related awareness promotional activities and trainings have been held for business entities and appliance suppliers, as well as source management, type certification, technical consultation and improvement of machinery safety. For example MOL issues "Guidelines for subsidizing SME explosion proof electrical equipment type approval and purchasing new up to standard products" helps business entities improve existing machinery equipment, and offers technique support of product safety enhancement, targeting on machinery manufacturers, and testing subsidies.

For the precondition of maintaining the safety performance of explosion proof electrical equipment, OSHA has actively pushed for the mutual recognition of test reports by testing bodies. Machinery manufactured domestically or imported with certificate through qualified testing bodies can apply for type testing by written reports. Those that meet safety standards will be granted a "type testing verified" certificates. By the November of 2013, there are 1,274 types of explosion proof electrical equipment granted with type certificate.

According to Labor Inspection Act, a labor inspection agency, including a designated inspection agency, performs inspection of dangerous machinery or equipment. Inspection is categorized into type testing, use testing, modification testing, and regular testing. Dangerous machinery includes lifting and elevating machines. Dangerous equipment contains boilers, pressure vessels, specialized vessels or containers for use with high pressure gas. Routine inspection is required for dangerous machinery or equipment in use. When internal inspection of specialized equipment for use with high pressure is unable to carry out within limited time period, it is mandated to apply for risk-based permission period extension or alternative inspection. In 2012 there were 23 cases of such applications.

The number of labor inspection carried out by labor inspection agencies is 15,918 in 2012. Cases of OSH inspection are 105,603. Lifting and elevating machines inspections are 36,878 cases. Boiler inspections are approximate 7,519 cases. Pressure vessels inspection reaches 31,500 cases. The number of inspection for specialized equipment for use with high pressure gas is near 31,916. Inspections of specialized vessels for use with high pressure gas are close to 4,552 cases. (The number above includes inspections conducted by

designated inspection agencies.)

## 5.7 Construction Safety

“Standards of Safety and Health of Construction Facility” introduces regulations in workplace, materials storage, scaffolds or working platforms, excavations in open ground, tunnel excavation, construction of box caisson/shaft/sunk well/cofferdam, compressed air system, equipment for pile and foundation, reinforced concrete construction, steel assembling, structure demolition, painting/ asphalt project, and sanitary facility. OSHA sets out “Operation Guidelines for Advanced Public Construction Safety and Health” and actively promotes occupational accident prevention programs in construction industry, which provide construction safety and education training materials for OSH managers, and devises specific OSH management system for construction.

Public construction contractors are required by OSHA to give clear and detailed construction drawing and specifications, pricing documents, and the use during planning and design stage of construction. For contracts exceeding 5 billion NTD, contractors should carry out OSH risk assessment based on the process of construction, a trial run, cleaning, maintenance, and demolition. Also OSH and risk assessment is requested. Moreover man power and expense supporting risk assessment should be specified in technical service contracts.

The contract safety management of construction site is highly concerned by the OSHA and business entities. OSHA also issues the guidelines of Taiwan Occupational Safety and Health Management System for Construction Industry to promote sound management. Prior to contracting operations in whole or in part, business entity shall inform the contractor regarding the work environment, hazard factors, and mandated OSH measures. Prior to subcontracting all or part of the operations, the contractor shall also inform the subcontractor in accordance with the above mentioned. When business entity, contractor and sub-contractor individually hire labors to work together, the original business entity shall institute measures to prevent occupational accidents. Those include to establish a consultative organization, and to appoint a person in charge of the workplace to be responsible for supervision and coordination. If business entity contracts two or more contractors, by contributing fund, to operate jointly, contractors shall select one person to act as representative; who is deemed to be the employer of such project and accounted for the responsibilities of OSH Act to prevent occupational accidents.

The construction industry is accounted for around 50% occupational major accidents of all industries, many of fatality are due to falling from height and electric shock. In recent 3 year (2010~2012) “working on roof” has the top fatality rate in construction industry with annual average 20.91 persons per thousand workers. The main causes are 1. stepping through the roof and then falling, and 2. falling from the edge of roof. “Metal structure preparation and assembling workers” is the second serious with fatality rate 2.17, due to falling during steel structure and steel plate erecting. “Cleaning work at construction site” is the third serious with fatality rate 1.34, due to falling from the edge of elevator pit, piping pit and edge of floor. The other top ten fatality causes are “welding and cutting work”, “other construction structure work, including scaffolding”, “template work”, “painting and spray painting”, “steel bar bending and bundling, “air conditioner & refrigeration machinery installation and repair”, in order.

In 2012 "Strategy aimed at Preventing Falls from Roofs", "Strategy aimed at

Preventing Construction Falls", "High-tech Facility Construction Inspection Project", "SME Construction Site Inspection and Assistance Plan", "Perfect Occupational Safety-Zero Accidents Public Construction Program", "OSH Check for Wall Cleaning Task of High Rise Building", "Renovation Construction Special Checking Project" and "Renovation Inspection after Complex Completion " was performed 47,700 times in total. MOL also held numerous OSH education and trainings for the workers of self-employed or without fixed employer through all kinds of construction vocation unions. IOSH also sets up a major occupational accidents network of construction industry to share experience learning from accident cases and the prevention knowledge.

## 5.8 Process Safety Management

Petrochemical entities that engage in petrochemical cracking, or engage in the production, handling, or use of hazardous chemicals in amounts that exceed those stipulated by the MOL, should carry out regular process safety assessment within the time limits prescribed by the MOL. The same applies for production modification. Mechanical integrity, risk-based inspection, management of change, HazOp analysis, multi-layers of protection, incident investigation and performance indicators of process safety management are emphasized so as to prevent major accident. According to Labor Inspection Act, without the approval of labor inspection agency or not having passed inspection(s), the business entity shall not allow workers to work in the following hazardous workplaces:

1. Places which engage in the cracking process of petroleum products in a petrochemical plant.
2. Places which manufacture agricultural chemicals.
3. Factories making fire-crackers and fireworks or gunpowder.
4. Places which install high pressure equipment containing gases or steam boilers which reach the pressure or capacity criteria as set in the regulation by MOL.
5. Places which manufacture, process and use dangerous or harmful materials in quantities at or exceed the threshold level as specified by MOL.
6. Places of construction projects designated by MOL in consultation with the supervisory authority of the targeted business entities.

To apply for the review of process safety management by labor inspection agencies, business entities submit documents, including (1) basic information on safety and health management, (2) process safety evaluation report, (3) process change safety plan, (4) emergency response plan and (5) audit management program. In 2012, the number of application for such inspection reached to approximate 540 times.

With the help of IOSH, OSHA frequently conducts activities including special inspection program, accident investigation, fire & explosion research, run away reaction research, case study, safety culture evaluation and safety behavior evaluation for the petrochemical industry. Industries with potentially high consequence are encouraged by OSHA to implement leading industrial standards, such as codes or standards of API, ASME and SEMI. In addition, petrochemical entities that engage in petrochemical cracking are required to have Occupational Safety and Health Management System in place. The Petrochemical entities are always in the annual priority inspection list of MOL. The MOEA also collaborates with MOL and other agencies, such as national fire agency of MOI and the EPA, to conduct comprehensive supervision of process safety in order to prevent catastrophic accidents.



## 5.9 Occupational Accident Notification, Investigation, Insurance and Compensation

For business entities hiring 50 labors or more as well as entities designated and notified by labor inspection agencies, employers should use occupational accident statistic system to monthly report work-related accident resulted in at least a day off work. Occupational accident monthly reporting form includes two parts:

1. Information about business entity, such as classification of industry, number of workers, total working days and hours.
2. Information about workers having occupational accidents, such as identity, body affected, event or exposure leading to injury or disease, source of injury and disease, category of disablement (i. fatality, ii. permanent total disablement, iii. permanent partial disablement, iv. temporary total disablement), and days off work.

Insured persons incur injuries and diseases resulting from performance of duties, shall receive medical and cash benefit from Labor Occupational Accident Insurance Fund as subsidiary. For those insured works applying for occupational accident insurance benefit, manufacturing industry accounts for 40%, followed by construction industry (around 25%). With regard to events and sources that lead to injuries or diseases are mainly general power machine, material, environment, construction materials and equipment, power transport apparatus and tools, power transmission apparatus, man power mechanic tools. Off all events in manufacturing industry, 38% resulted from rolled or caught, 23% caused by stab/ scratch/ cut. As for main accidents in construction industry are tab/ scratch/ cut, 27% and fall down or rolling, 25%. However, falling from height and electric shock are the major causes of occupational fatality in construction industry.

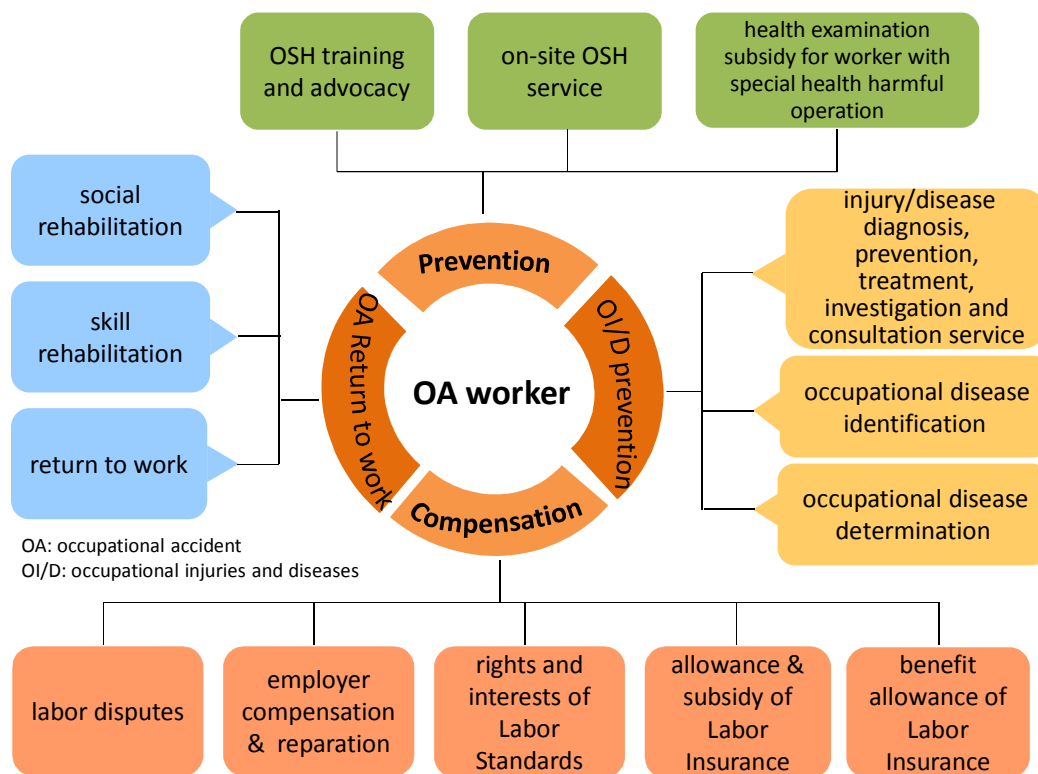
In 2009~2012, there were 6,771 cases of disease notification from the Network for Occupational Disease and Injury Services (NODIS). Musculoskeletal disorders with 2,799 cases, accounted for 41%, were the top occupational disease. The others included occupational hearing loss (2,310 cases; 34%), occupational lung diseases (521 cases; 8%), occupational skin diseases (465 cases; 7%), occupational physical diseases (238 cases; 4%), occupational nervous system diseases (91 cases; 1%), occupational cardiovascular diseases (71 cases; 1%), occupational blood diseases (65 cases; 1%), occupational liver diseases (39 cases), occupational eye diseases (20 cases), occupational kidney diseases, and others (high-concentration blood lead, severe depression, post traumatic stress disorders, etc.; 95 cases)

## 5.10 Occupational Accident Workers Rehabilitation and Return-to-Work

Occupational Accident Labor Protection Act came into force in 2002. Subsidies are broadly offered to workers not participating in the labor insurance scheme but suffered from occupational accidents. Compensations can be divided into subsidies for workers covered by labor insurance and not, as well as benefits for occupational accidents prevention and occupational rehabilitation.

MOL launches active service programs, “The Family Assistance Program, FAP” and “Caring Occupational Accidents Workers.” And OSHA sets up case management service helpdesk for workers affected by occupational accidents nationwide; through individual case management and the consolidation of resources, staffs are able to provide assistance in referrals for medical care, occupational rehabilitation, assistance in resolving labor disputes and lawsuits, vocational rehabilitation and welfare resource organizations, injured or ill workers returning to the work.

Since 2008 to April 2013, there have been near 28,760 workers and families benefited. 327,000 people were served in total. However, there are still around 45.6% or 31.3% of workers could not return to work after 3 months or a year post occupational accident, respectively. For those occupational accident workers received hospitalization for at least 3 days, 20% of them are diagnosed as psychological abnormality, and 7.5% of them appear severe depression or post traumatic stress disorders. Figure 5.3 shows the protection and resource map for occupational accident workers.



**Figure 5.3 Protection and resource map for occupational accident workers.**

### 5.11 SME OSH Assistance

There are around 1.31M SME, hiring 8.48M workers in 2012. The number of SME in manufacturing industry is around 137,436, and workers are 2.17 million. In construction industry number of SME is around 103,130 and workers are 0.83M.

MOL OSHA in conjunction with local governments and regional SME consultation centers put forward a rooted OSH capacity-building project, a.k.a. Rooted Project, aims at improving OSH awareness and capacity of SME. One part of this project is to arrange supports from the OSHA for county governments and regional SME centers to hire official OSH specialists and to organize basic OSH service teams to disseminate OSH information and provide necessary consultation. The other part provides service tools, training, and technical assistance to facilitate the service of the county OSH specialists and their teams. This part has multi-discipline professionals to provide comprehensive technical supports, and it also serves as a quality control office as well as a basic OSH service team for those counties without official OSH specialists.

Rooted Project provides OSH consultation for manufacturing or construction business entities, not in industrial parks, with less than 100 workers. The project also provides financial support depending on entities' individual need. Also an OSH website targeting SME

is introduced, which provides up-to-date information, consultation or subsidies application, OSH management tools, risk assessment, educational program, bi-monthly e-newspaper, promotional clips, leaflets, good industrial practices, etc. The bi-monthly e-newspaper readers are over 40,000.

Approximately 1.6M SME workers of 71,000 manufacturing and construction companies were covered by this Project from 2007 to 2012. 84% of received-assistance companies have less than 30 workers or 92% less than 50. Statistics indicated that the average accident rate of SME was reduced by 12.1% after 1~2 years, while the reduction of general industries was 4.4%. The SME expressed a degree 4.66 satisfaction (on a 1-5 scale survey) regarding the implementation of this project. Most of SME wish to continue receiving assistance, including training, counseling, subsidization on OSH hardware improvement, and experience-sharing seminars. The estimated economic benefit ratio of occupational accident reduction for those SME, received assistance in 2008 ~ 2011, as compared with the project budgets was approximately 2.8:1.

In addition, OSHA organizes OSH awareness promotion activities for workers in manufacturing and construction, offers subsidies for renewing old safety facility, and provides safety consultation for machinery use for high risk business entities, and training programs targeting workers without specific employers. In 2012 there were additional 24,000 business entities, 18,000 working sites visited and 120 training programs held.

## **6 OSH Research and Promotion Schemes: some examples**

### **6.1 Institute of Labor, Occupational Safety and Health**

The IOSH of MOL is the national OSH dedicated research institute. Its organization includes research divisions of labor market, labor relations, occupational safety, occupational health, and occupational hazard assessment. IOSH also establishes an OSH Exhibition division for technology demonstration and dissemination. One of IOSH's major duties is to provide the amendment recommendations of policies, laws and regulations to the MOL and its OSHA. Moreover, IOSH provides a good communication channel for international information and technology exchange. Meanwhile IOSH gives technical supports to assist labor inspection and the investigation, determination & prevention of occupational injuries and diseases.

IOSH conducts researches regarding (1) labor market, human resource and employment security, (2) labor relations, labor conditions and labor wellbeing, (3) occupational safety & health technology and management, (4) hazard assessment and management of occupational injuries and diseases, (5) occupational accident prevention and return-to-work rehabilitation of occupational accident workers, and (6) application and dissemination of researches.

IOSH involves in the following OSH related researches: safety management, mechanical safety, electrical safety, chemical safety, safety system integration and risk control, construction safety, workplace monitoring, labor exposure surveys, biological monitoring, musculoskeletal disorder prevention, slips/trips/falls prevention, high temperature hazard prevention, noise exposure assessment, non-ionizing radiation evaluation, biological hazards prevention, industrial ventilation, particles and nano-material hazard prevention, health promotion, health protection for female workers, vocational rehabilitation, vocational mental health, occupational disease surveillance, occupational epidemiology, occupational cancer, prevention of vulnerable population and emerging hazards, etc.

Subsequent application and invention have been developed and demonstrated in the national first OSH Exhibition Hall and two mobile demo vans. The OSH Exhibition Hall has been well-known as the annual, essential off-campus teaching spot of senior vocation high schools as well as the visiting list of trade unions, trade associations, related organizations and business entities. IOSH also collaborates with National Science Museum to visualize and demonstrate OSH technologies and awareness to the public, including interactive computer games, 3D virtual reality theater. The quarterly research journal, OSH alert, technical books, databases, videos, micro movies, animation, website, seminars and patent transfer have made IOSH as the priority channel for workers to assess the latest OSH information and knowledge.

### **6.2 OSH Academic Research**

There are over 20 universities that offer degrees in OSH relevant fields, such as department of occupational safety and health, department of environmental and safety health engineering, department of environmental and occupational medicine, department of environmental and occupational health, program in public health department, program in industrial engineering department, program in construction engineering department, etc. There are around 1,000 students graduated at bachelor's degree, 390 at master's degree

and 30 at doctoral degree per year.

Main fields of academic researches include exposure assessment, occupational medicine, health risk assessment, epidemiology, musculoskeletal disorders, ergonomics, health promotion, labor psychology, health policy, nano-material health effect, bio-aerosol, sampling method and equipment, respiratory protective equipment, skin penetration and protection, industrial ventilation, , noise and vibration control, workplace control engineering, process safety assessment, reactive hazards analysis, fire and explosion prevention, reliability analysis, material non-destructive testing, engineering mechanics, mechanical safety, electrical safety, static electricity prevention, construction safety, safety behavior, safety culture, risk assessment, OSH management system, etc.

The Workforce Development Agency of MOL subsidizes OSH related departments of universities to invite working professionals jointly conducting OSH practical employment programs for senior students. The Ministry of Education also encourages universities to increase practice-based curriculums. By means of industry-academy cooperation projects, students enhance their work-orientated learning attitude. OSH related departments also encourage students to have workplace internships so as to foster workplace substantive capacity.

### **6.3 Social OSH Development and Promotion**

Industrial Safety and Health Association (ISHA) of the R.O.C, Taiwan Occupational Hygiene Association (TOHA), Taiwan Environmental and Occupational Medicine Association (EOMA), Industrial Technology Research Institute (ITRI), Metal Industries Research and Development Centre (MIRDC), Safety and Health Technology Center (SAHTECH) and other related organizations deliver comprehensive R&D services, actively support and promote technology development, and provide educational training programs. Also these organizations keep promoting international information exchange, holding seminars and providing profession recommendations to OSH policy.

## 7 Social Partnership Mechanisms and Activities

### 7.1 OSH Collaboration

#### 7.1.1 National Level

##### 7.1.1.1 Taiwan OSH Management System Family

To encourage strong and effective TOSHMS, MOL OSHA has established TOSHMS family since 2010 September. Around 800 business entities, accredited with TOSHMS certificates, join regional family in north, central, and south. TOSHMS family forms a network to regularly share knowledge and experience, advocate practical cooperation among members, and assist supply-chain factories.

##### 7.1.1.2 Industrial Park OSH Promotion Council and Safety Partnership Program

Besides using advocacy tools, such as inspections and consultations, for policy promotion, OSHA adopts a policy of forming safety network to distribute accidents prevention resources of large companies into SME with high risk of occupational accidents. With such assistances, SME improve workplace safety and health installations and establish OSH self-management system. In the same light on-site managers will increasing OSH awareness. It is hoped that greater awareness will lead to the implementation of necessary preventive measures to avoid accidents.

Additionally OSHA provides Safety Partnership members with help and services, including entity assessment, education and trainings, visiting good safety practice companies. By the end of 2012, there have been 14 engineering projects, 45 large companies, 31 trade unions, and all 62 industrial parks involving in Partnership program.

There are further 20 OSH Promotional Councils, including 15 regional organizations (in industrial park or science park) and 5 same-sector organizations (for example, hospitals and construction industry). Total member number is 1,325 and labor number is 433,000.

MOEA also provides OSH assistance to the industries, and coordinates OSH-accident joint-defense for the high-risk factories in industrial park. The Industrial Development Bureau of MOEA builds OSH & environmental alliances in all 62 industrial parks and holds regular emergency drills and on-site experience exchange activities.

##### 7.1.1.3 OSH Family of Small-sized Business Entities

MOL OSHA and local governments corporately organize small-sized-entity OSH family as part of the OSH Rooted Project. In such network family, a core company—as a safety benchmark—guides a small and marginal company (with less than 100 employees) toward better OSH management.

Around 20 entities have received assistance in each family for three years. By the end of 2012, 83 family groups (~1,600 business entities) are working in this program. There have been 750 training programs or on-site experience learning activities. 16,200 suggestions for on-site improvement have been made, and rate of improvement reaches 85%.

#### **7.1.1.4 OSH Collaboration Schemes of Indigenous Peoples and Fishermen**

MOL IOSH jointly with Council of Indigenous Peoples (a R.O.C. Ministry) creates a prevention of occupational injury and disease website for indigenous peoples, including a monitoring system on occupational accidents among indigenous workers and health information database. Also train the trainer programs, educational and promotional materials are provided. An ultimate goal is to reduce accidents and secure safety and health for indigenous peoples at work.

Seeing that falls and cuts non-fishing work had become leading causes of occupational accidents in fishing industry, Council of Agriculture (a R.O.C. Ministry) and MOL collectively began to provide fishermen with OSH assistance, safety gloves and slip resistant safety shoes since 2012.

### **7.1.2 Regional Level**

#### **7.1.2.1 OSH Centers of OSHA**

OSH Centers of OSHA actively implement labor inspection. Besides signing a Safety Partnership with leading companies, OSHA encourages Safety Partnership in supply chain and provides consultation for high risk works. Occupational accident information, hazard prevention information, and training materials and videos are offered in website.

OSH Centers also set out professional prevention strategies for unique characters of local industry. To fully implement strategies, OSH Centers provide supports and training materials and hold demonstration activities.

#### **7.1.2.2 Municipal City Government OSH Scheme**

Municipal city governments not only carry out labor inspection, but also offer variety of supports and services, such as OSH consultant groups, educational programs, Safety Partnership, OSH alert, e-newsletter, text-messaging, etc. Moreover OSH websites are devised to deliver information, tools and education materials, and domestic/ international conferences, information exchange forums and trainings are often held.

Municipal city governments award medals to encourage OSH, and hold award ceremonies and exhibitions for awareness promotion. Furthermore mayors of the Municipal city governments along with directors of Labor Affairs Bureau and Inspection Office frequently makes OSH declaration, announces implementation of annual OSH inspection and participates in relevant activities, such as trade association meeting and union meeting. In addition, Municipal city governments frequently hold OSH exchange visits with international well-known cities.

### **7.1.3 International Cooperation**

MOL OSHA frequently exchange views of labor inspection strategies, OSH laws & administration, OSH codes & specification, OSH research with the official organizations of Japan, the United States, EU, South Korea, etc. OSHA also frequently invites international OSH experts to visit Taiwan with the assistance by academic institutes, organizations and local governments.

OSHA has undertaken an APEC project of the GHS Reference Exchange and Tool,

G.R.E.A.T. website since 2007. Currently the “G.R.E.A.T.” website covers the GHS labeling elements in 32 languages, serving as a reference for the region and other economic bodies.

To deepen connection, MOL IOSH has built up platforms for effective cooperation with many countries, such as the United States, Japan, Germany, United Kingdom, French, South Korea, Australia, Singapore as well as 50 related academic institutes and organizations. Moreover IOSH has built international reputation based on research excellence in nano-particle sampler, nano-particle explosion, industrial ventilation, biological hazards prevention, negative pressure isolation chamber, workplace monitoring, OSH technology 3-D demo & body-experience, etc.

## 7.2 OSH Regular Activities and Awards: some examples

### 7.2.1 National Level

#### 7.2.1.1 April 28 Safety Day

Responding to the World Day for Safety and Health at Work of International Labor Organization (ILO), in 2001 MOL declared April 28th as National Day of Mourning for workers killed on the job to honor the memory of victims of occupational accidents. The meaning is twofold- the government affirms the dignity of occupational accident victims, and the society contemplates and exams the occupational accident events. It makes the society pay attention to issues of occupational accidents and henceforth reduces and prevents accidents at workplace.

#### 7.2.1.2 National Occupational Health Week and Safety Week

MOL OSHA officially marks the first week in May and July as “Healthy Workplace Week” and “Safe Workplace Week”, respectively. Coordinately domestic and international specialists and scholars are invited to attend OSH conference during the weeks, sharing experience and latest information. Also together with safety benchmarking companies or professional organizations, OSHA holds OSH best practices conferences to facilitate the exchange of industrial experience. Meanwhile, public agencies, business entities, schools, trade associations, and OSH related organizations are encouraged to conceive an annual plan to implement “Safety and Health Weeks,” as well as to hold awareness raising activities and training programs. OSHA reviews and evaluates end-term reports handed in by those who develop and fulfill plan. To recognize their contribution, OSHA grants those organizations with certificates or awards.

#### 7.2.1.3 Awards

Awards	Minimal Requirements
Zero Accident Certificate	Business entities participated in Records of Work-hour without Occupational Injury Programs, are granted zero accident certificates if no work-related injury occurs during a time period. The time period is set depending on the labor number threshold. MOL publicly shows honor and awards medals to the best performing companies or ones hit the record 5 times in each labor number threshold.



Awards	Minimal Requirements
Advanced OSH Award	Advanced OSH Implementation Award is established to encourage business entities and relevant groups to implement and promote OSH. Companies that have no major occupational accident or have no injury status of physical residual impairments over level 9 both the year and 3 years before participation in the award certificate program. And during the 3 year period, disablement injury frequency rate and severity rate need to be lower than the 3 year average of the same industry. Also MOL sets individual awards for employees to recognize their devotion.
Excellent Public Construction OSH Award	With a view to enhancing OSH performance in public construction, and promoting implementation of safety management as well as improving safety culture, MOL selects and awards OSH excellent public contractors and individuals. Contractors are grouped in accordance with the characteristics of outsourcing organizations ( or representatives organizations) and project size, and then evaluated. Qualifications for participating in the evaluation are as below. "Percentage completion" for the project has to reach certain level. There is no major occupational accident or no injury status of physical residual impairments over level 9 during construction. And contractors never have been notified for partial or complete shut down by labor inspection agency, or fined more than 1.5 million NT dollars.
Five Star Award	Five Star OSH Implementation Award is designed for well performing business entities that win two consecutive Advanced OSH Implementation Awards. In the third year, MOL gives reviews based on size of business entities and industrial sectors, and then awards the prize to best performing companies. Business entities with less than 100 workers are also included.
National Safety Award	Model companies committed in OSH management and achieved in high standard are recognized through National Industrial Safety & Health Award. Established by MOL, National Industrial Safety and Health Award is the highest honor in Taiwan. Corporate groups, including branch organizations are qualified participants and number of participants is limited to 10. After serious procedure and evaluation, only 2~4 benchmarking companies are awarded. In general, corporate groups awarded have all subunits that win Advanced OSH Implement Awards and some of the subunits gained Five Star Award. They also domestically and internationally achieve safety excellence in the field. MOL sets individual awards for persons, in charge of civil society, to recognize their OSH devotion.

## **7.2.2 Business Entity Level**

### **7.2.2.1 Regular Activities of OSH Management Personnel in Business Entity**

Business entities are required to establish OSH commission consisted of at least 7 members. The commission comprises a head of business entities or the representative, OSH management personnel, managers/administrators/directors, OSH related technicians, medical professionals, union or its representatives. The commission is required to provide the following activities:

1. Provide suggestions to OSH policies drafted by employer.
2. Coordinate and make suggestions to OSH management plans.
3. Review execution plans for OSH trainings and education.
4. Review findings and action strategy of workplace monitoring.
5. Review measures for health management and promotion.
6. Review OSH proposals.
7. Review self-inspection and self-audits of business entities.
8. Review risk prevention measures of machinery, equipment, (raw) materials.
9. Review occupational accidents investigation reports.
10. Evaluate OSH management performance.
11. Review OSH affairs relevant to contract management.
12. Other relevant OSH affairs.

In July 2013, there are 9,898 OSH management personnel, 1,547 occupational safety management specialists, 709 occupational hygiene management specialists, 8,841 class-1 managers of OSH affairs, 5,024 class-2 managers and 1482 class-3 managers working in the business entities.

### **7.2.2.2 Regular Activities of on-site Health Service**

Business entities that employ 50 workers or more are required to hire or contract on-site occupational health care staff to provide worker occupational health prevent and management services, which include: (1). health education for labors. (2). occupational and general injury and disease prevention, health counseling, emergency response and first aid. (3). vaccination and health care recommendation. (4). matching workers with the jobs. (5). workers shape and health records analysis, evaluate, management, retention, as well as health management. (6). retention of occupational health and hygiene field study reports, and injury and disease records. (7). implementation of occupational disease prevention measures and improvement of work environment. (8). missions designated by the MOL.

OSHA also commissioned 9 medical centers for prevention and treatment of occupational injuries and diseases to provide on-site occupational health care services for SME. Business entities are assisted in conduction assessment, prevention of occupational diseases, and health promotion by occupational health care personnel and occupational hygienists. In 2012, 54 on-site services were provided, by considering the regional industrial characteristics.

### **7.2.2.3 SHE Month of Science Park**

The Allied Association for Science Park Industries incorporated with three science-park administrations regularly initiate "Science Park SHE month." Sponsor companies are responsible for activities during that month. Activities, including conferences, marathon, physical fitness tests, occupational safety and fire protection

equipment exposition, garden party, innovative poster competition, photo competition as well as occupational safety and environmental comic drawing competition are held separately in northern, central and southern science parks.

#### 7.2.2.4 Union

In general, around 2-3 million workers who are either self-employed or do not have a definite employer can obtain OSH information, trainings and assistance by participating relevant vocational associations. Those workers also can join the national labor insurance program through such associations. MOL and local governments also provide OSH training and discussion meeting for the administrative staffs of vocation unions, and subsidy the trainings for their member workers.

### 7.3 Other Social OSH Activities : some examples

#### 7.3.1 OSH Training and Consultation Service

In 2012, there were 160 training institutes, running 5,020 courses. In recent year there are 140 to 150 thousands of workers received such trainings. 35 consultant offices of Certified Safety Professionals or Industrial & Mining Hygienists are in practice. There are several multidiscipline engineering consultant firms, certified by central government, provide design, assessment and engineering control of process safety, electrical safety, construction safety, workplace control engineering, etc.

According to the end-of-course statistics from Workforce Development Agency, it shows that participants in industrial human resource investment programs are around 62,100 persons and on-the-job self-directed learning plans are around 24,700. Around 1,108,500 persons are assisted in human resources improvement for business entities in 2012.

**Table 7.1 Statistics of OSH training institutes in 2012**

Category of Training Institute	Number
Training institute of non-profit organization	156
Employer association	26
Union	21
University or college with safety and health departments or departments specified for relevant trainings	27
Hospital approved by MOHW, or university and college with medical and nursery departments	19
Competent authority (CA) (labor CA, health CA, OSH research institute, labor inspection agency or industry CA)	18
Business entity	498
Others	35
total	302

There are another around 500 business entities running MOL OSHA certified training courses internally.

**Table 7.2 Statistics of OSH training by category in 2012**

Category	Classes	no. of Trainees
OSH management specialists	386	11,603
OSH affair managers	767	23,329
OSH affair managers of construction industry	243	6,438
Supervisor in charge of construction works	268	6,175
Safety supervisor of high-pressure gas production	50	1,248
Supervisor of harmful operations	639	16,809
Workplace monitoring specialist	2	58
Process safety assessor	27	669
Dangerous machinery operator	469	11,603
Dangerous vessel operator	343	10,103
Special task (such as forklift, high pressure chamber, diving, tanker cleanup) operators	1,290	37,724
First aid personnel	520	16,998
Occupational health service nurse	18	575
total	5,022	143,332

### 7.3.2 Workplace Monitoring Service

From workplace monitoring database in recent year, there are 100,000 monitoring compounds annually, involving 32 monitoring bodies and 90 workplace monitoring specialists, including 60 certificated industrial/mining hygienists and 12 accredited industrial hygiene laboratories.

### 7.3.3 Labor Health Examination Medical Service

Medical institutes are designated by MOL and MOHW can be categorized into institutes for conducting (1) general labor health examination and (2) special labor health examination. To offer labor health examination service, medical professionals at designated institutes should obtain qualified certificates in occupational medicine, occupational health nursing, and OSH training. When designated institutes perform labor health examination and find the cases fall into grade 3 according to the Health Management Level, designated institutes should report to the local OSH competent authority where the business entities locates. By the end of 2012, designated medical institutes have 637 doctors and 1,530 nursing professionals in responsible for labor health examination. Each year 5,600 business entities receive services, including special health examination for 168,000 labors. 1,920 workers are reported to be cases that fall in grade 3 or above according to the Health Management Level.

### 7.3.4 Occupational Injury/ Disease Clinic Service

Up to now Taiwan have 9 centers for prevention and treatment of occupational injuries and diseases, and one quality service management center. 65 hospitals join the Network for Occupational Disease and Injury Services (NODIS). The network provides 190 walk-in occupational medicine clinics per week and labors can receive medical services from occupational medicine doctors at location within 30 kilometers of workers' residence. In 2012 patient-visit service was provided to 16,344 workers.

The roles of multi-discipline professionals of OIDPT centers are as follow:

1. Occupational medicine doctor: Assists the evaluation of potential health hazard factors, and provides services of occupational disease and injury prevention, diagnosis of work-disease causation, health consultation, evaluation of return to work, and rehabilitation referral, etc.
2. Case manager: Provides contact service of the accident worker with his/her employer, labor insurance and social resources. Assists to maintain the rights of accident worker based on his/her need.
3. Occupational therapist: Assists the accident worker to (1) adjust to different lifestyles, (2) maintain work capability, (3) assist to find the related feasible improvement physical factors of work environment, or referral to other institutes for return-to-work evaluation, physical rehabilitation and occupational rehabilitation. In the long run assist the accident worker returning to the work or starting a new career via job matching.
4. Occupational hygienist: Assist to identify hazard factors of workplace and protection measures, and response for investigation and assessment of occupational hazards.

### 7.3.5 Activities of Industrial Associations: some examples

Association	Relevant Activities
Taiwan Responsible Care Association (TRCA) <a href="http://www.trca.org.tw/">http://www.trca.org.tw/</a>	TRCA was established in 1988 to promote the sustainability commitment of chemical industry. Members of TRCA have to regularly and continually publish SHE performance indicators reports. TRCA introduces Buddy System that multinational or experienced member companies help local companies with responsible care systems. TRCA also organizes chemical accident prevention and emergency response coordination programs among member companies and industrial parks. In addition, TRCA spends a lot of time advocating instruments of ICCA chemical risk assessment.
Taiwan Industrial Gas Association (THPGIA) <a href="http://www.tiga.org.tw/">http://www.tiga.org.tw/</a>	THPGIA was established in 1971. Along with MOL and Industrial Gas Association, THPGIA signed "Joint Declaration on Safety and Health" to establish safety operation regulations and systems. Also THPGIA and MOL hold international annual conferences on the use of industrial gas and bring domestic safe use of industrial gas in line with international.
The Allied Association for Science Park Industries (ASIP) <a href="http://www.asip.org.tw/content.php?catid=2">http://www.asip.org.tw/content.php?catid=2</a>	ASIP was founded in 1983. OSH commission of ASIP is available in services of risk management, safety inspection, workplace safety and prevention, safety management for contractors, insurance for employees, occupational accident prevention, emergency response, and network connection. Science Park Administrations with assistance from ASIP initiate "SHE month." every year. ASIP not only offers professional advices, but also actively participates in government researches, exchange of experience and on-site demonstration activities.

Association	Relevant Activities
Taiwan Steel & Iron Industries Association (TSIIA) <a href="http://www.tsiaa.org.tw/frontend/index.aspx">http://www.tsiaa.org.tw/frontend/index.aspx</a>	TSIIA was founded in 1963. Every year TSIIA publishes statistics information about the occupational accidents of member companies, as well as screens and selects companies for best OSH performance at work. Conferences for exchange of OSH experience or practices, and consultation services are also provided. In order to boost OSH management performance, in conjunction with IOSH and related institutes, TSIIA develops risk control technology for steel and iron industries, as well as digital teaching media and technical manuals.

## 8 OSH Professionals and Data Bases

### 8.1 OSH Professional Staffs

Civil Service or Professional License	Persons <sup>a</sup>
Public Service	
Public labor inspector	395
Public designated inspector for dangerous machinery and equipment	124
Professionals <sup>b</sup>	
Occupational medicine doctor	301 <sup>c</sup>
Occupational health service doctor	837 <sup>d</sup>
Certified safety professional, industrial & mining hygienist (by national examination of the Examination Yuan)	510 <sup>e</sup>
Workplace monitoring specialists	1,400 <sup>f</sup>
Process safety assessor	8,000 <sup>g</sup>
Business Entity	
OSH management specialists (occupational safety management specialist, occupational hygiene management specialist, OSH management personnel)	46,340 <sup>h</sup>
OSH affair managers (including construction industry)	135,000 <sup>i</sup>
Occupational health service nurse	2,330 <sup>j</sup>

<sup>a</sup> Some persons might have several professional licenses.

<sup>b</sup> Some professionals might be full time hired by business entity.

<sup>c</sup> 1995 ~ 2012

<sup>d</sup> 2009 ~ 2013

<sup>e</sup> 1987 ~ 2012

<sup>f</sup> 1991 ~ 2012

<sup>g</sup> 1994 ~ 2013

<sup>h</sup> 1974 ~ 2012

<sup>i</sup> 2009 ~ 2013

<sup>j</sup> 2009 ~ 2013

### 8.2 Occupational Hygiene Exposure Hazards Data Base

IOSH conducts occupational exposure hazard survey to establish data base. All field surveys are conducted by industrial hygiene inspectors of Labor Inspection Agencies. Types of domestic occupational hygiene exposure hazard factors, annual handling quantity of chemicals, number of exposure labors, OSH prevention measures and exposure risks are studied.

OSHA utilizes statistic methods to investigate the industries with inferior management and control measures so as to facilitate further improvement. Moreover, combining workplace monitoring data base and chemical SDS data base, OSHA identifies high risk industry, priority improvement factors of exposure hazards, exposure factors of individual industry (including management and control measures), correlation between organic solvent exposures and health examination results.

### 8.3 Workplace Monitoring Data Base

Workplace monitoring data base are provided for monitoring bodies or

industrial/mining hygienists to register arrangement 24 hours before monitoring. The monitoring results should also be submitted within 7 days. OSHA keeps improving effectiveness of national occupational hygiene hazard exposure monitoring management system. To that end, OSHA checks data reported from workplace monitoring data base, rectifies monitoring plans made by monitoring bodies and related systems, and holds technology and quality improvement seminars. Confidently reliability of information for occupational hygiene management decisions will be advanced as well as professional techniques of workplace monitoring specialists.

The data base is exclusive use of workplace monitoring related bodies, industrial/mining hygienists, or MOL. In recent year, exposure data of around 100,000 compounds are reported. Statistic results show top-list chemicals of over the permissible exposure limits usually are total dust, respirable dust, toluene, lead and its inorganics, ethylene oxide, N,N dimethyl formamide, 2-ethoxyethyl acetate, formaldehyde, etc. Most of data are reported from electronic, semiconductor, photo-electronic, petrochemical and chemical material industries.

#### **8.4 SDS Data Base**

By 2013 October, SDS data base provides 4,000 GHS format SDS examples in Chinese and 4,000 labeling examples. Users can employ search engines with keywords, CAS number, English names or Chinese name, etc. But users need to adjust the SDS examples depending on their onsite usage and quantity to make SDS more appropriate. Users can refer GHS website <http://ghs.osha.gov.tw> for further information.

By 2013 October, existing chemical substances are reaching 79,000 in database, covering 19,000 substances with GHS hazards, and 3,900 substances with relatively higher potential hazards and industrial utilization quantities. Information related to chemical substance notification and nomination can be searched at <http://csnn.osha.gov.tw>.

#### **8.5 Labor Health Examination Data Base of Special Hazardous Operations**

According to "Regulations of the Labor Health Protection," labors can apply for health examination for working in high health risk environments once a year when their time period of enrollment in labor insurance meets the requirement of Labor Insurance.

The high health risk works are high-temperature work, noise operation, ionizing radiation operation, abnormal pressure work, lead operation, tetra-alkyl lead operation, dust operation, working with specific organic solvent (e.g., tetrachloro methane, dimethyl formamide, n-hexane), working with certain chemical substances (e.g., asbestos, arsenic, benzene, vinyl chloride), production/handling/use of phosphorus, production of paraquat and other operations designated by MOL.

Designated medical institutes should monthly submit health examination reports "Labor Insurance- Health Examination for Occupational Accidents Prevention" by electronic media to Bureau of Labor Insurance. Bureau of Labor Insurance will pay for the expense of health examination.

Historic data show top 5 working conditions where works carried out health examination the most are noise working environment, dust working environment, lead operation, ionizing radiation operation, and high temperature working environment, by-order. These conditions account for 88% of the total labors taking health examination.



The top 2 working conditions account for 65%. Labor age, gender and industry information are also included in the health examination reports submitted to the Bureau of Labor Insurance.

## **8.6 Labor Inspection Data Base**

OSHA compiles an annual report of labor inspection based on labor inspection database, including labor situation, labor inspection, dangerous machinery and equipment inspection, special working environment inspection, process safety management review, major occupational accidents analysis, monthly statistical report of occupational injury and disease, and relevant statistics. The submission of monthly OSH statistic report is mandated for the business entities hiring 50 labors or more as well as entities designated and notified by labor inspection agencies.

The monthly report covers industry sectors, types of hazards, media, injured body part information and relevant information, such as information about insurance payment for occupational accidents covered by labor insurance. The insurance payment information is by industries( like agriculture, forestry, fishing, animal husbandry, mining and quarrying, manufacturing, and construction ) and includes injuries under labor insurance, occupational accident rate under labor insurance(per thousand population), events type and cause of occupational injury/disease/disablement/fatality, fatality rate per thousand workers, number of insurance payment cases, and payment amount. Such statistic information is limited to 1 death or more at workplace in business entities covered by OSH Act, as well as 3 labor injuries or more caused by occupational accidents.

Cases of OSH inspection carried out by labor inspection agencies are 105,900 times of business entities and cases of OSH inspection are 105,600. Cases that breach Labor Standards Act and referred to the competent authority are 4,151. 4,103 cases are fined (punishment rate is 26.1%) and 48 cases are referred to judicial organs. Cases violating OSH Act are 7,900. Punishment rate is 7.5% and 3,300 are fined. Cases of partial shutdown are 4,360 and total shut down cases are 15. Also 258 are referred to judicial organs.

## **8.7 Occupational Injury and Disease Notification Data Base**

To encourage centers for prevention and treatment of occupational injury and disease to establish occupational accidents diagnosis and reporting system, to provide medical service near residence of injured or ill labors, and to increase reporting rate, guidelines to subsidizing occupational accidents diagnosis and reporting system are set and issued.

Occupational injury/disease notification data base refers to the designated systems for cases report to MOL. Such cases reported are also verified by centers for prevention and treatment of occupational injury and disease (OIDPT), and the OIDPT management center. Information reported includes exposure situation in practice (by industry, work experience, assessment of workplace), disease diagnosis (history, physical examination and clinic finding, laboratory examination), occupational disease assessment (evidence of disease, evidence of exposure, timing, medical literature reference, causative factors of related illness, and general evaluation).

In 2011, 4,106 cases of OI/D were reported. As compared to 1,345 cases of year 2007, it increased by 369%. There were 2,010 cases of occupational diseases and 44% was occupational hearing loss. Occupational insurance payments are made for cardiovascular disorders and diseases caused by over-fatigue in recent 2 years, and there are near 200

cases each year. For the injured body parts are fingers, hands, foot, legs, heads, knees, cheeks, backs, elbows, chests, wrists, and shoulders, in order. The most common occupational diseases are hearing loss, musculoskeletal disorders, occupational skin diseases, lung diseases and strokes.

### **8.8 Occupational Accident Insurance Payment Data Base**

Labors participated in labor insurance and suffered from occupational accidents accordingly receive occupational injury and disease benefit by Bureau of Labor Insurance. Benefits are as below.

1. Occupational insurance injury and disease payment: is cash benefit been paid to workers for who are undergoing treatment and unable to work and therefore cannot earn a wage.
2. Occupational insurance disablement payment: is cash benefit been paid if workers are permanently disablement after medical treatment is over. The disability needs to conform to payment standard.
3. Occupational insurance fatality payment: refers to cash benefit when death occurs because of occupational injury or disease.

Labor insurance includes insured units, number of participants, industry, insurance salary, benefit payment, payment amount, and payment classification. Information about the insurance payment can statistically produce information about insured units, occupational injuries number under labor insurance, occupational accident rate under labor insurance(per thousand population), disablement injury frequency rate and severity rate. Data of tables 2.2 and 2.3 are part of this data base.

### **8.9 Labor OSH Training Information System**

The Labor OSH training information system is available for searching for course schedules, training institutes, evaluation standards and past evaluation results, training and testing standards for machinery equipment operators, end of course computer based system for managers, open information database available for searching for training materials and equipment as well as a platform for training institutes . Data of tables 7.1 and 7.2 are part of this data base.

## **9 Emerging OSH Challenges**

With the efforts of all stakeholders, Taiwan has experienced sound OSH performance for the past 4 decades. From 2002 to 2012 the occupational fatality rate per 100 thousands workers has been significantly reduced over 55% (from 6.5 to 2.9), and the rate of 2012 is 2.9 per 100 thousands workers. However as benchmarking with the fatality rate of United Kingdom, Japan, Germany and the United States, Taiwan still has space for continuous improvement.

The total occupational accident rate per 1,000 workers slowly decreases by 14% over 10 years (from 4.650 to 3.999), and results indicate that reduction of minor occupational injuries, discovery and prevention of occupational diseases, occupational health service coverage and rehabilitation of occupational accident workers are also the targets for future improvement.

As a non-UN state, Taiwan has limited official connections with central governments of other countries to access latest international trends of OSH policies. However, MOL will continue involving employers, employees, public agencies, occupational accident workers groups and academic institutes to protect the safety, health and wellbeing of all workers. The SWOT analysis of Taiwan occupational safety and health is shown on Table 9.1.

**Table 9.1 SWOT analysis of Taiwan OSH**

Strength	Weakness
<ul style="list-style-type: none"> <li>• Occupational Safety and Health Act has been launched since 1974.</li> <li>• All workers are covered by the OSH laws and regulations</li> <li>• Sound separate system for labor trainings and certificate examination.</li> <li>• Sound system for the OSH design, manufacturing, installation, operation and regular inspection of dangerous machinery and equipment.</li> <li>• Relevant unions and labor groups carefully monitor the national OSH policies and performance.</li> <li>• Many OSH academic institutes provide high quality professionals.</li> <li>• Good collaboration mechanisms of public agencies.</li> <li>• Risk-based labor inspection strategies continue improving.</li> <li>• Municipal governments increase numerous inspectors to strengthen the enforcement.</li> </ul>	<ul style="list-style-type: none"> <li>• OSH public administration resources are limited.</li> <li>• Coverage of occupational health service is low (~20%).</li> <li>• Occupational accident workers return-to-work need further facilitate.</li> <li>• No OSH public arm's length body.</li> <li>• OSH public servants need to continuously improve inspection practices and quality</li> <li>• Smart inspection for high risk operations need further improve.</li> <li>• Assistance coverage of SME and other vulnerable need further improve.</li> <li>• OSH mutual aid among business entities or associations need to enhance.</li> <li>• OSH social participation need further involve.</li> </ul>
Opportunity	Threat
<ul style="list-style-type: none"> <li>• The focuses of newly amended Occupational Safety and Health Act, including source management of machinery, equipment &amp; chemicals, female worker health protection, physical &amp; psychological health, OSH accountability of employer, designer &amp; manufacturer, will enable the OSH performance of Taiwan in line with international level.</li> <li>• OSH awareness of workers increases</li> <li>• Severe accidents and occupational health cases bring public concerns.</li> <li>• OSH is an essential indicator of international trade and basic human right.</li> <li>• Source companies of international supply chain and factory insurance companies also require business entities to fulfill local and international OSH regulations, which impose primary supply companies to ask their sub-contractors also to follow.</li> </ul>	<ul style="list-style-type: none"> <li>• Trend of ageing labor force &amp; low birth rate, structural change of industrial sectors, increase of service industries, and increase of self-employed workers results to the increment of overtime, fatigue, mental and physical stress, musculoskeletal disorders, etc.</li> <li>• OSH training and compliance assistance for hard-to-reach business entities need further widespread</li> <li>• Aging facilities and equipment generally found in high risk entities, pose OSH potential threats.</li> <li>• Citizens lack of risk awareness and safety culture.</li> <li>• Entity management usually lack of OSH concerns.</li> <li>• OSH management personnel lack of channels to upgrade capacity and experience heritage.</li> <li>• National OSH research and application need further enhancement to cope with the drastic change of economic and industry.</li> <li>• Central government lack of international exchange channels, difficult to assess latest OSH policies and trends.</li> </ul>

## 10 OSH Vision and Strategy

Based on the comprehensive consideration of safeguarding the basic labor rights, preparing safe and healthy workforce, improving OSH of workplace, promoting employment, facilitating occupational accident workers return-to-work, being in line with international advanced trends, and the resources of OSHA, the national OSH vision and strategy are as follow.

### **Vision:**

1. Ensure the health, safety and dignity of everyone at work.
2. Provide comprehensive services for prevention, compensation and rehabilitation of occupational injuries and diseases.
3. Secure workforce safe and healthy so as to facilitate national competitiveness.

### **Goal:**

1. Continue mitigating occupational accident rate, and safeguard basic human right of every worker.
2. Build a sound inspection system for working conditions so as to safeguard workers' rights and their physical-mental-health, and create dignity workplaces.
3. Develop source management scheme of machinery and chemicals, and be in line with international advanced level.
4. Foster business entities to conduct safety and health self-management, and implement risk management.
5. Strengthen the prevention, compensation and return-to-work schemes of occupational accident workers so as to care for less-privileged labors and safeguard workers' rights.
6. Assist industry improving and transforming work environment, provide occupational health service, and facilitate the employment of youth, ageing and local workers.

### **Strategies:**

1. to achieve Goal 1 include:
  - a. Timely refine OSH related laws and regulations.
  - b. Adjust OSH inspection strategies to enhance enforcement effectiveness.
  - c. Partner with employees, employers and other public agencies to promote safety culture of all stakeholders.
2. to achieve Goal 2 include:
  - a. Enhance labor conditions inspection effectiveness of local government to protect workers' rights and dignity, and to enhance physical and mental health.
  - b. Establish national occupational health service network to provide approachable OH services.
  - c. Upgrade the assessment and control effectiveness of occupational hygiene hazards.
  - d. Actively participate in national health promotion and work-related diseases prevention programs.
  - e. Enhance effectiveness of labor health examination.
  - f. Promote health risk assessment programs for maternity workers protection.

3. to achieve Goal 3 include:
  - a. Develop source safety certification schemes for machinery, equipment and personal protective equipment.
  - b. Develop chemical management scheme.
  
4. to achieve Goal 4 include:
  - a. Facilitate the implementation of OSH self-management system.
  - b. Promote industrial OSH collaboration to upgrade risk management performance.
  - c. Promote broad-base OSH training, education and advocacy, and provide necessary consultancy & technical assistance.
  - d. Facilitate high risk industries implementing hazardous workplace safety management.
  - e. Refine OSH performance incentives to encourage employers, industrial competent authority agencies and local governments to pursuit high-quality OSH performance.
  
5. to achieve Goal 5 include:
  - a. Amend Occupational Accident Labor Protection Act.
  - b. Establish more effective national notification mechanism of occupational injuries and diseases.
  - c. Integrate diagnosis, rehabilitation, compensation, and prevention schemes of OAW.
  - d. Establish rehabilitation programs for occupational accident workers.
  - e. Develop core technologies of OAW rehabilitation.
  - f. Train the professionals of occupational medicine/ nursery, OAW rehabilitation and occupational hygiene.
  - g. Establish national data bases of workplace monitoring, labor health examination, and occupational injuries and diseases.
  - h. Enhance international exchange and collaboration of OAW rehabilitation.
  - i. Establish an arm's length public body from the MOL to execute relevant affairs of OA prevention and OAW rehabilitation by contracts.
  
6. to achieve Goal 6 include:
  - a. Establish occupational safety and health assistance network, with focus on small and medium-sized enterprises.
  - b. Assist industry improving and transforming work environment, and participate in national employment facilitation programs.
  - c. Establish occupational health service network to facilitate the employment rate of elder workers.

## **Annexes A Reference Document: Technical Standards, Norms and Rules**

### **1. Technical Standards, Norms and Rules: some examples**

- (1) Occupational hygiene laboratory accreditation specification, MOL, 2013
- (2) Workplace monitoring guidelines, MOL, 2010
- (3) Validation processes for reference sampling and analytical methods of workplace hazardous substances, IOSH, 2012
- (4) Precaution items on carrying or lifting personnel operation with hanging or ride equipment of crane, MOL, 2009
- (5) Precaution items on risk-based permission period extension or alternative inspection of the regular internal vessel inspection for dangerous equipment, MOL, 2003
- (6) Acceptable list of designated foreign standards for dangerous machinery and equipment, MOL, 2008
- (7) Construction safety inspection standards of hi-tech facilities, MOL, 2005
- (8) Review guidelines of on-duty labor-insurance workers suffered injury or disease, MOL, 2011
- (9) Reference guidelines of occupational disease determination, MOL, 2012
- (10) Occupational maternity health protection guidelines, MOL, 2012
- (11) Heat stress prevention guidelines for workers under high temperature work environment, MOL, 2012
- (12) Health service working guideline- overloading operations, MOL, 2013
- (13) Service working guideline- return to work, MOL, 2013
- (14) Health service working guideline- lead operations, MOL, 2013
- (15) Health service working guideline- matching and fit to work, MOL, 2013
- (16) Health service working guideline- work in noise operations, MOL, 2013
- (17) CNS 4750 Tubular steel scaffolds, BSMI, MOEA, 2008
- (18) CNS 14252 Safety nets, BSMI, MOEA, 1998
- (19) CNS 14253 Full body harness, BSMI, MOEA, 1998
- (20) CNS 7534 Safety Belts for line- men, BSMI, MOEA, 1998
- (21) CNS 15030 Classification and labelling of chemicals for general rules, BSMI, MOEA, 2006
- (22) CNS 6636 Gas respirators, BSMI, MOEA, 1998
- (23) CNS 6638 Supplied air respirators, BSMI, MOEA, 1998
- (24) CNS 6860 Compressed air open-circuit self-contained breathing apparatus, BSMI, MOEA, 1998
- (25) CNS 14755 Disposable dust respirators, BSMI, MOEA, 2011

### **2. OSH Management System- Standard Documents, Guidelines and Rules**

- (1) Taiwan occupational safety and health management system- guidelines, MOL, 2007
- (2) Taiwan occupational safety and health management system- certification specification, MOL, 2007
- (3) Taiwan occupational safety and health management system- guidelines for the implementation, MOL, 2010
- (4) Taiwan occupational safety and health management system- application guidelines and practices for certification, MOL, 2012
- (5) Risk assessment- technical guidelines, MOL, 2010
- (6) Purchase management- technical guidelines, MOL, 2009

- (7) Contractor management- technical guidelines, MOL, 2009
- (8) Management of change- technical guidelines, MOL, 2009
- (9) Emergency response- technical guidelines, MOL, 2009
- (10) Taiwan occupational safety and health management system for construction industry- guidelines, MOL, 2011
- (11) Guidelines for business entity implementing zero-accident-work-hour record, MOL, 2008
- (12) Guidelines for business entity implementing occupational safety and health management system, MOL, 2007
- (13) CNS 15506 Occupational health and safety management systems- requirements, BSMI, MOEA, 2011
- (14) CNS 15507 Occupational health and safety management systems- guidelines, BSMI, MOEA, 2011
- (15) CNS 14809 Guidelines for auditing management systems, BSMI, MOEA, 2013
- (16) CNS 31000 Risk management- principles and guidelines, BSMI, MOEA, 2012
- (17) CNS 31010 Risk management- risk assessment techniques, BSMI, MOEA, 2012
- (18) CNS 14889 Risk management-terms and definitions, BSMI, MOEA, 2012



## Annexes B Information and Resources

### 1. OSH Relevant Information and Websites: some examples

- (1) Ministry of Labor <http://www.mol.gov.tw/>
- (2) Occupational Safety and Health Agency <http://www.osha.gov.tw/>
- (3) Institute of Labor, Occupational Safety and Health <http://www.iosh.gov.tw/>
- (4) Bureau of Labor Insurance, MOL <http://www.bli.gov.tw/>
- (5) Law source retrieving system- labor laws and regulations, MOL  
<http://laws.cla.gov.tw/>
- (6) Industrial assistance web, IDB, MOL <http://assist.nat.gov.tw/GIP/wSite/mp?mp=2>
- (7) Taiwan OSH information network, MOL <http://safety.cla.gov.tw/>
- (8) SME OSH information network, MOL <http://www.sh168.org.tw/>
- (9) Taiwan occupational safety and health management system network, MOL  
<http://www.toshms.org.tw/>
- (10) Performance recognition network of occupational safety and health management system, MOL <http://www.osha-performance.org.tw/>
- (11) Zero accident work-hour record network, MOL <http://www.zeroacc.url.tw/>
- (12) Industrial safety and health technical assistance network, IDB  
<http://www.cesh.twmail.org/>
- (13) Occupational accident prevention information network for indigenous people, IOSH  
<http://www.iosh.gov.tw/oio/>
- (14) Information network of OSH training and education, MOL  
<https://trains.cla.gov.tw/>
- (15) Third-party training examination service network of OSH training and education-management, MOL <https://lsh.etest.org.tw/LSHweb>
- (16) School safety and health information network, MOE <https://www.safelab.edu.tw/>
- (17) Globally harmonized system of classification and labelling of chemicals network, MOL  
<http://ghs.osha.gov.tw/frontPage/index.html>
- (18) Chemical substance nomination & notification network, MOL  
<http://csnn.osha.gov.tw/content/index.aspx>
- (19) Labor health care service information network, MOL <http://www.cla-ohsip.org/>
- (20) Labor health relaxation network, MOL [http://wecare.cla.gov.tw/lcs\\_web/](http://wecare.cla.gov.tw/lcs_web/)
- (21) Occupational injury & disease management service center network, MOL  
<http://www.tmsc.tw/>
- (22) Occupational accident worker protection resources network, MOL  
[http://www.mol.gov.tw/cgi-bin/siteMaker/SM\\_theme?page=4be13ac9](http://www.mol.gov.tw/cgi-bin/siteMaker/SM_theme?page=4be13ac9)
- (23) Healthy workplace network, HPA <http://health.hpa.gov.tw/>
- (24) Tobacco's disease prevention and control network, HPA  
<http://tobacco.hpa.gov.tw/>
- (25) Obesity prevention and control network, HPA  
<http://obesity.hpa.gov.tw/web/index.aspx>
- (26) Taipei City Labor Inspection Office <http://www.doli.taipei.gov.tw/>
- (27) Kaohsiung City Labor Standards Inspection Office  
<http://www.klsio.gov.tw/index.php>

### 2. OSH Journals: some examples

- (1) Occupational Safety and Health Research quarterly, IOSH, MOL
- (2) Industrial Safety and Health monthly, Industrial Safety and Health Association of the R.O.C.

- (3) Chinese Journal of Occupational Medicine quarterly, Taiwan Environmental and Occupational Medicine Association

**3. OSH Training Materials and Training Aids: some examples**

- (1) Workplace risk assessment training material- occupational safety and health management personnel and specialists, MOL, 2013
- (2) Workplace risk assessment training material- occupational safety and health affair managers, MOL, 2013
- (3) Chemical control banding- application guidelines, MOL, 2012
- (4) Chemical control banding- introduction, MOL, 2011
- (5) Safety protection illustrated manuals- manufacturing industries, MOL, 2008
- (6) Safety protection illustrated manuals- construction industries, MOL, 2009
- (7) Occupational safety and health management personnel training material, Industrial Safety and Health Association of the R.O.C., 2013
- (8) Occupational health management specialist training material, China Productivity Center, R.O.C., 2013
- (9) Occupational safety management specialist training material, Labor Safety and Health Management Society, R.O.C., 2013
- (10) Fire and explosion of nano materials, IOSH, 2011
- (11) Occupational stresses and over-fatigue, IOSH, 2011
- (12) Workplace infectious diseases, IOSH, 2011
- (13) Musculoskeletal disorders prevention, IOSH, 2011
- (14) Exposure survey and assistance, IOSH, 2011
- (15) Scaffolding and safety components, IOSH, 2011
- (16) Recommended sampling and analytical methods for workplace hazardous substances, MOL, 1991~2013
- (17) Risk assessment practice manuals of steel industry, IDB, 2011
- (18) OSH self management practice manuals of phototronic and semiconductor industries, IDB, 2009
- (19) OSH self management practice manuals of bio-tech industry, IDB, 2009
- (20) OSH body-experience training center- China Steel Corporation (R.O.C.)  
<http://www.cscss.com.tw/about.asp>
- (21) OSH body-experience training center- Taiwan Power Company  
<http://tpc.teamye.com.tw/hat1/tpca4-4-4.htm>

## Annexes C National Background Information

Taiwan is situated in the West Pacific between Japan and the Philippines. The territory includes the main island of Taiwan, the archipelagoes of Penghu, Kinmen and Matsu, as well as numerous other islets—altogether covering an area of 36,191 square kilometers. At about the size of the Netherlands and with a population of over 23.3 million (as of 2012.12), Taiwan is more populous than three-quarters of the world's nations.

Taiwan proper, measuring 395 kilometers from north to south and 144 kilometers from east to west at its widest, has more than its share of natural splendor. Mountain ranges with many peaks reaching over 3,000 meters—including East Asia's highest, Jade Mountain—and forested foothills occupy over half of its area. Other physiographical regions include volcanic mountains, tablelands, and coastal plains and basins.

The Executive Yuan comprises eight ministries and 29 additional commissions and agencies, whose heads are appointed by the premier and form the Executive Yuan Council (such as the Ministry of Labor, the MOL), commonly referred to as the Cabinet.

The premier bears the overall responsibility for formulating and implementing programs and must report regularly to the Legislative Yuan (Legislature). In order to raise administrative efficiency, the Executive Yuan will reduce the number of Cabinet-level agencies from 37 to 29 by creating new agencies while merging or eliminating old ones. The new streamlined structure gradually takes effect in January 2012.

Besides reviewing and enacting legislation, the Legislature conducts hearings on policy matters, examines budgetary bills and monitors the operations of government agencies.

The Examination Yuan is responsible for managing the civil service system, the Judicial Yuan operates the nation's system of courts, and the Control Yuan is empowered to impeach and censure officials and audit government agencies.



Figure C1 Map of Taiwan Geographic Location

**Table C1 Taiwan at a glance**

<b>Area</b>	<b>36,191 sq. kilometers (13,973 sq. miles)</b>
<b>Population</b>	23.32 million (as of 2012.02)
<b>Ethnicity</b>	Han Chinese 98% (including Holo, Hakka and other groups which originated from mainland China); indigenous Austronesian peoples 2%
<b>Government</b>	Multiparty democracy
<b>Capital</b>	Taipei City
<b>Other major cities</b>	New Taipei City, Taichung City, Tainan City, Kaohsiung City
<b>Monetary unit</b>	New Taiwan Dollar (NT\$)
<b>Official language</b>	Mandarin (Chinese)
<b>Other important languages</b>	Taiwanese, Hakka, Austronesian languages, English, Japanese
<b>Major religions</b>	Buddhism, Taoism, I-Kuan Tao, Chinese folk religion, Catholicism/Christian, Islam

**Figure C2 Taiwan's administrative jurisdictions**

## Annexes D Labor Statistics

**Table D1 Labor statistics**

Labor Statistics	
Unemployment rate-2014.03	: 4.03%
no. of Employment-2014.03	: 11.03M
Labor force participation rate-2014.03	: 58.42%
no. of International migrant workers in production industries-2014.03	: 28.6K
no. of International migrant workers in social welfare services-2014.03:	20.9K
Minimum hourly wage-2013	: NT 109/hr

**Table D2 Taiwan labor force distribution**

Year	2002	2005	2010	2012
	(10 thousand persons)	(10 thousand persons)	(10 thousand persons)	(10 thousand persons)
Total	2239.7	2265.1	2303.6	2311.6
Civilian population aged 15 and over	1738.7	1794.9	1906.2	1943.6
Labor force	996.9	1037.1	1107.0	1134.1
Non-labor force	741.7	757.8	799.2	809.6
Employed	945.4	994.2	1049.3	1086.0
Unemployed	51.5	42.8	57.7	48.1
Services	541.3	579.3	617.4	638.1
Industry	333.2	355.8	376.9	393.5
Agriculture, forestry, fishing and animal husbandry	70.9	59.1	55.0	54.4
Employees	677.1	733.6	810.4	849.5
Unpaid family workers	69.5	66.6	58.5	57.0
Own-account	149.6	143.8	132.9	131.9
Employers	49.2	50.3	47.5	47.6

Source: Accounting and Statistics, Executive Yuan, R.O.C.

**Table D3 The age structure of labor force by age groups and genders**

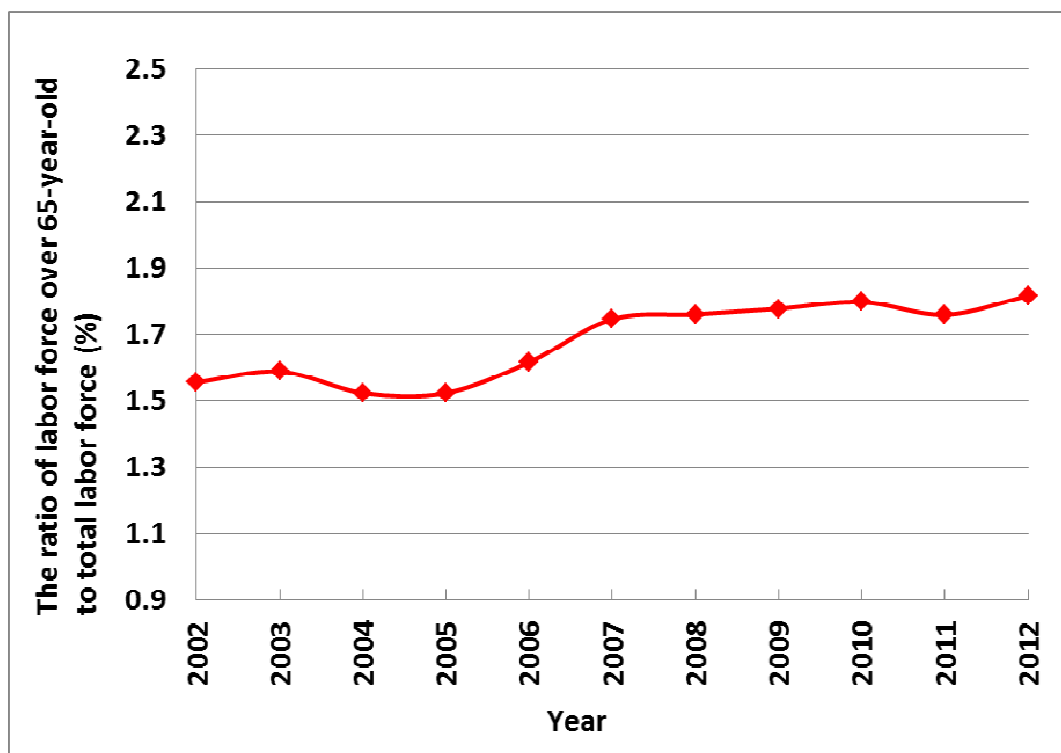
Year Age	2002		2005		2010		2012	
	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)	Male (%)	Female (%)
15~19	13.42	12.62	11.04	9.85	9.09	8.76	8.72	8.15
20~24	54.70	59.23	49.36	56.62	46.56	53.68	48.34	54.73
25~29	90.12	72.74	89.18	77.71	90.17	83.69	94.66	89.22
30~34	94.90	66.75	94.6	71.35	93.90	76.71	95.05	78.08
35~39	95.31	64.28	95.22	68.64	95.23	74.25	94.36	74.00
40~44	93.76	61.77	93.91	64.64	93.37	71.17	94.28	73.17
45~49	90.59	54.73	91.50	59.09	90.53	63.97	91.49	66.09
50~54	82.86	42.60	83.72	45.39	81.67	50.49	82.89	52.89
55~59	70.78	27.88	68.75	29.13	67.59	34.33	69.32	36.36
60~64	51.66	17.17	48.00	17.78	45.73	19.32	47.24	18.67
65+	11.54	3.78	10.66	3.93	12.07	4.43	12.46	4.20

Source: Accounting and Statistics, Executive Yuan, R.O.C.

**Table D4 The labor force participation rate by age groups and genders**

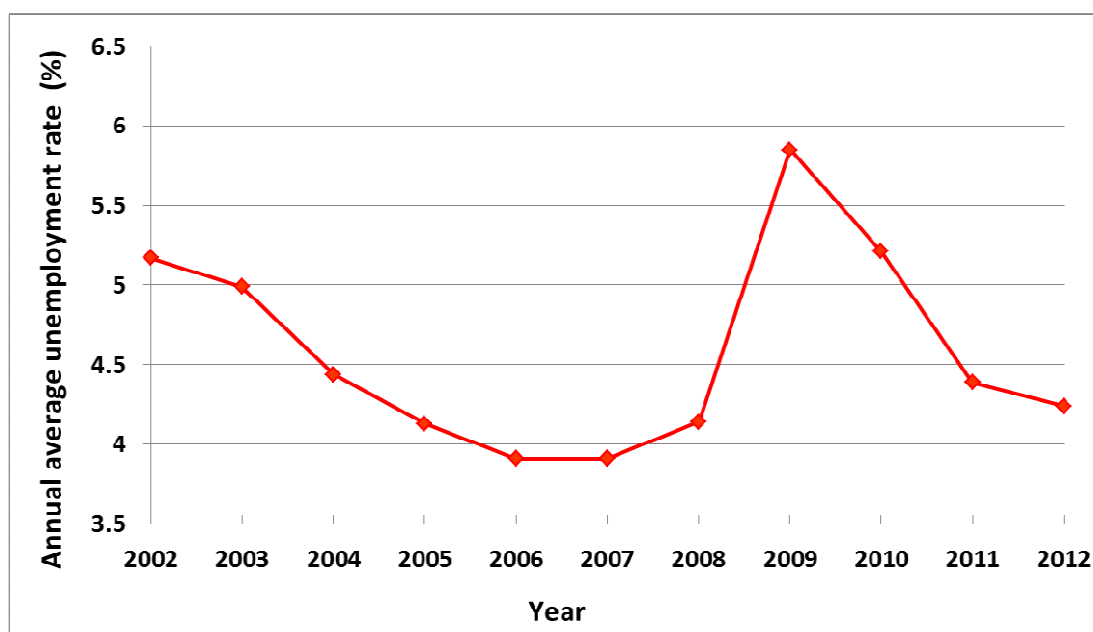
Year Age	2002		2005		2010		2012	
	Male (thousand persons)	Female (thousand persons)	Male (thousand persons)	Female (thousand persons)	Male (thousand persons)	Female (thousand persons)	Male (thousand persons)	Female (thousand persons)
15~19	117	105	89	75	73	67	72	63
20~24	420	571	374	518	325	407	342	416
25~29	797	656	844	751	824	790	765	757
30~34	868	608	824	629	910	766	926	792
35~39	911	608	877	632	827	667	843	691
40~44	877	571	898	613	857	658	848	674
45~49	764	458	813	526	851	606	850	622
50~54	542	278	654	356	709	447	742	484
55~59	282	113	339	146	508	267	548	299
60~64	198	70	185	72	214	95	283	118
65+	119	36	116	42	142	57	150	56

Source: Accounting and Statistics, Executive Yuan, R.O.C.



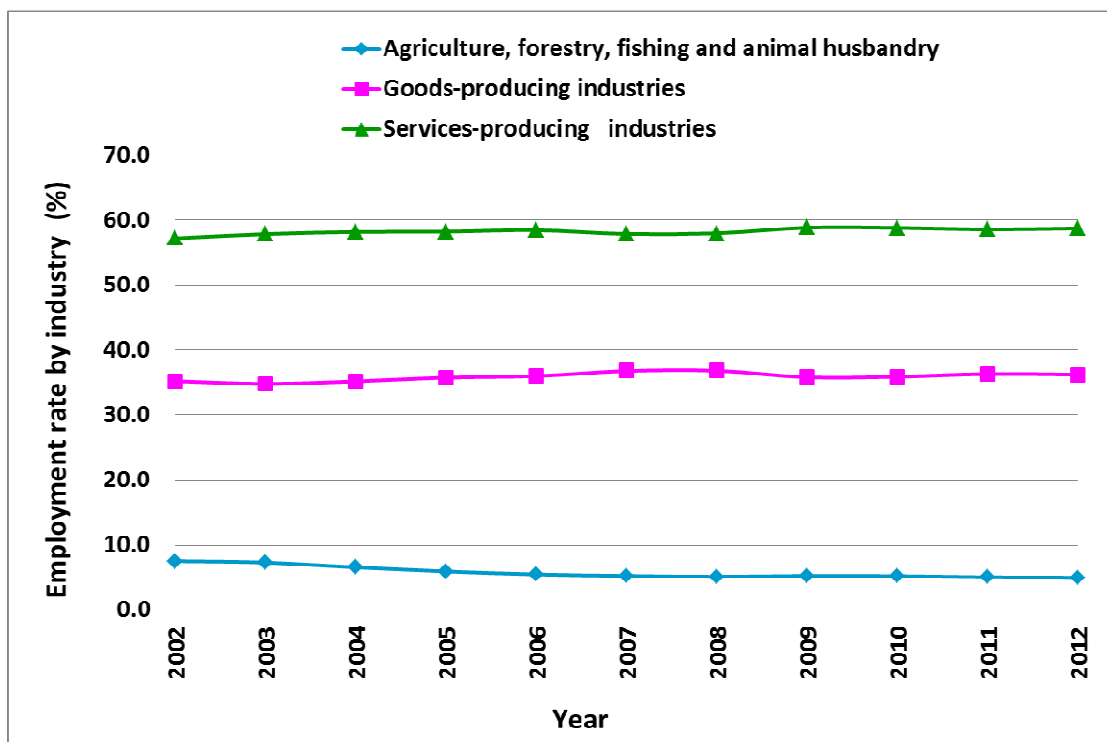
Source: Accounting and Statistics, Executive Yuan, R.O.C.

Figure D1 The ratio of over 65-years-old workers in total labor force (2002 ~ 2012)



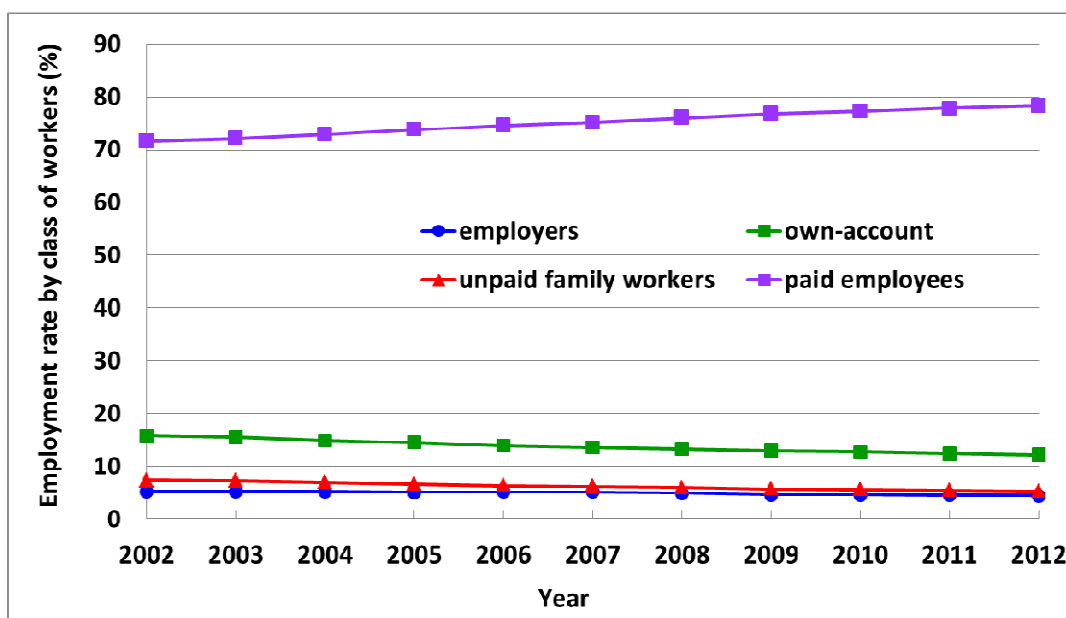
Source: Labor Statistics, MOL

Figure D2 The trend of annual average unemployment rate (2002 ~ 2012)



Source: Accounting and Statistics, Executive Yuan, R.O.C.

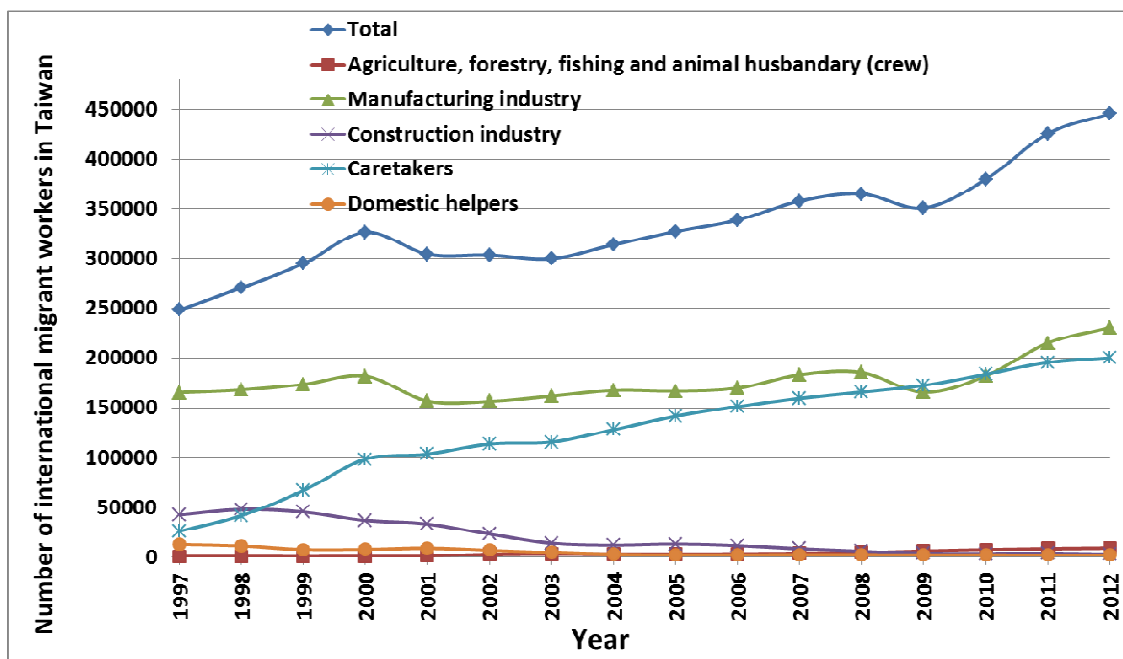
Figure D3 The employment trend by industries (2002 ~ 2012)



Source: Accounting and Statistics, Executive Yuan, R.O.C.

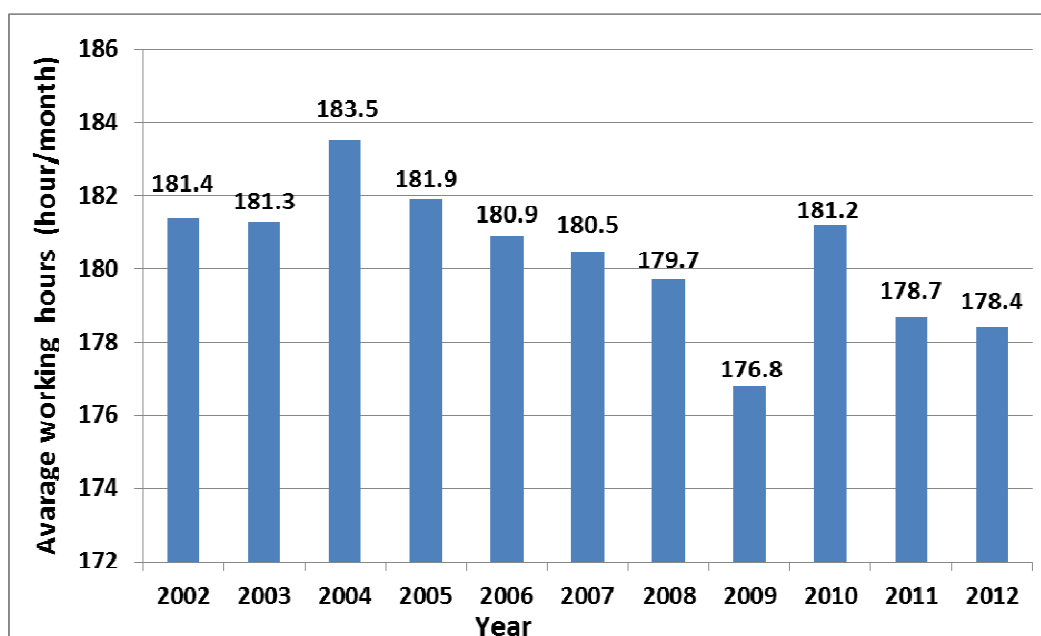
Figure D4 The employment trend by labor force status (2002 ~ 2012)





Source: Statistics, Bureau of Employment and Vocational Training, MOL

Figure D5 The number of international migrant workers by industry (2002 ~ 2012)



Source: Accounting and Statistics, Executive Yuan, R.O.C.

Figure D6 The average working hours in industries and services (2002 ~ 2012)

## **Annexes E References**

- (1) Annual Report on Labor Inspection(2012), MOL, 2013
- (2) Final Project Reports of the Department of Labor Safety and Health, MOL, 2012
- (3) Labor Laws and Regulations, MOL <http://laws.cl.gov.tw/>
- (4) Annual Report on OSH Research(2012), IOSH- MOL, 2013
- (5) Labor Statistics, MOL, 2013
- (6) Web-Information of the Directorate-General of Budget, Accounting and Statistics, Executive Yuan, 2013
- (7) Labor History, MOL, 2011 <http://100yearbook.cl.gov.tw/>
- (8) Vision and Strategy of Taiwan Occupational Safety and Health Administration, MOL, 2013

## Annexes F Other Information

### 1. OSH Relevant Regulations and Major Agencies

Issued (Founded) Date	Regulation or Agency	Recent Version
1931.02.10	Factory Inspection Act	(2002)
1949.03.21	Department of Labor, Ministry of the Interior founded	
1958.07.01	Labor Insurance Act	(2008)
1974.04.16	Labor Safety and Health Act	(2002)
1974.06.20	Prevention Rules of Organic Solvent Intoxication	(2003)
1974.06.20	Lead Intoxication Prevention Rules	(2002)
1974.06.28	Enforcement Rules of the Labor Safety and Health Act	(2009)
1974.08.07	Permissible Exposure Level Standards of Workplace Airborne Hazardous Substances	(2010)
1974.08.28	Standards for Labor Work/Rest Time in High-Temperature Workplace	(1998)
1974.09.06	Hypoxia Prevention Rules	(1998)
1974.09.06	Prevention Rules of Tetra-Alkyl Lead Intoxication	(1998)
1974.10.21	Management Rules for Designated Inspection Agency of Dangerous Machinery or Equipment	(2013)
1974.10.30	Labor Safety and Health Installation Rules	(2009)
1974.12.21	Safety Rules of Boilers and High Pressure Vessels	(2007)
1975.02.07	Vision Protection Standards for Labors in Precision Operations	(1996)
1975.02.18	Safety Rules of Cranes and Lifts	(2008)
1975.03.31	Construction Safety and Health Installation Standards	(2010)
1975.05.24	Regulations of Occupational Safety and Health Management and Self-Inspection	(2011)
1975.06.10	Safety and Health Standards of Harbor Loading and Unloading	(2010)
1975.06.12	Regulations for Labor Safety and Health Education and Trainings	(2013)
1975.07.03	Mine Health Installation Standards for Labor	(1998)
1976.02.16	Labor Health Protection Rules	(2013)
1976.02.16	Prevention Standards of Specified Chemical Substance Hazards	(2008)
1978.06.27	Protection Standards for Labors in Heavy Physical Operations	(1998)
1981.07.27	Dust Hazard Prevention Standards	(2003)
1982.07.15	Protection Standards for Labors Working at Height	(1997)
1984.07.30	Labor Standards Act	(2011)
1987.01.19	Hazard Prevention Standards of Industrial Robots	(1998)
1987.05.18	Prevention Standards of Abnormal Pressure Hazards	(2012)

Issued (Founded) Date	Regulation or Agency	Recent Version
1987.08.01	Council of Labor Affairs founded (a ministry; mainly expanded from the Department of Labor, Ministry of the Interior)	
1988.06.29	High-Pressure Gas Rules for Labor Safety	(2011)
1990.02.07	Labor Safety Rules for Ship Tank Cleaning and Dismantling	(2000)
1991.11.27	Standards for Prohibited Dangerous or Hazardous Works Involving Child or Female Worker	(1991)
1992.02.14	Labor Workplace Monitoring Regulations	(2009)
1992.08.01	Institute of Occupational Safety and Health founded	
1992.12.28	Hazard Communication Regulations of Dangerous and Harmful Materials	(1999)
1993.02.03	Labor Inspection Act (amended from Factory Inspection Act)	(2002)
1993.08.25	Enforcement Rules of the Labor Inspection Act	(2002)
1994.05.02	Dangerous Workplace Verification and Inspection Regulations	(2012)
1995.12.13	Safety Inspection Rules for Dangerous Machinery and Equipment	(2011)
1996.06.29	Health examination Rules for Occupational Disease Prevention by Labor Insurance	(2009)
1996.10.04	Regulations of Labor Body and Health examination by Assigned Medical Organizations	(2013)
1998.12.02	Type Inspection Regulations for Machinery and Tools	(2013)
2000.07.27	Machinery and Tools Protection Standards	(2009)
2001.10.31	Occupational Accident Labor Protection Act	(2013)
2002.01.16	Gender Equality in Employment Act	(2011)
2002.04.10	Regulations of Allowance and Approbated Grant for Occupational Accident Labor s	(2013)
2002.04.10	Regulations of Workers with Occupational Accidents who withdraw from Insurance Program in the Medical Period Continue to Join Labor Insurance	(2010)
2002.04.26	Enforcement Rules of the Occupational Accident Labor Protection Act	(2013)
2003.04.09	Mandatory Safety and Health Installations Standards of Workplace for Female Working at Night	(2003)
2004.10.20	Occupational Accident Prevention Subsidy Regulations	(2004)
2004.10.20	Regulations of Vocational Rehabilitation Grants for Occupational Accident Labors	(2004)
2005.05.12	Safety Inspection Standards for Mobile Crane Conformation	(2005)
2005.05.12	Safety Inspection Standards for Fixed Crane Conformation	(2005)
2005.05.12	Safety Inspection Standards for Gondolas Conformation	(2005)
2006.01.11	Safety Inspection Rules for Existing Dangerous Machinery and Equipment	(2012)
2006.02.20	Safety Inspection Standards for Lift Conformation	(2006)

Issued (Founded) Date	Regulation or Agency	Recent Version
2007.10.19	Regulations of Labeling and Hazard Communication of Dangerous and Harmful Materials	(2007)
2008.11.07	Safety Inspection Standards for Pressure Vessel Conformation	(2008)
2013.07.03	Occupational Safety and Health Act (amended from Labor Safety and Health Act)	
2014.02.17	Ministry of Labor founded (mainly re-structured from the Council of Labor Affairs, CLA)	
2014.02.17	Occupational Safety and Health Administration founded (mainly consolidated from OSH related departments of CLA)	
2014.02.17	Institute of Labor, Occupational Safety and Health (mainly re-structured from the Institute of Occupational Safety and Health Research, CLA)	
2014.02		

## 2. Relevant University: some examples

University	Website
National Taiwan University Institute of Occupational Medicine and Industrial Hygiene Institute of Environmental Health Institute of Health Policy and Management	<a href="http://www.cph.ntu.edu.tw/">http://www.cph.ntu.edu.tw/</a>
National Cheng Kung University Dept. of Environmental and Occupational Health	<a href="http://www.ncku.edu.tw/deoh/">http://www.ncku.edu.tw/deoh/</a>
National Yang-Ming University Institute of Environmental & Occupational Health Sciences	<a href="http://ieohs.web.ym.edu.tw/">http://ieohs.web.ym.edu.tw/</a>
National United University Dept. of Safety, Health and Environmental Engineering	<a href="http://www2.nuu.edu.tw/">http://www2.nuu.edu.tw/</a>
National Kaohsiung First University of Science and Technology Dept. of Safety, Health and Environmental Engineering	<a href="http://www.she.nkfust.edu.tw/">http://www.she.nkfust.edu.tw/</a>
National Yunlin University of Science and Technology Dept. of Safety Health and Environment Engineering	<a href="http://ues.yuntech.edu.tw/">http://ues.yuntech.edu.tw/</a>
National Taiwan University of Science and Technology Dept. of Construction Engineering	<a href="http://www.ct.ntust.edu.tw/">http://www.ct.ntust.edu.tw/</a>
National Tsing Hua University Dept. of Industrial Engineering and Industrial Management	<a href="http://www.ie.nthu.edu.tw/">http://www.ie.nthu.edu.tw/</a>
Chung Shan Medical University Dept. of Occupational Safety and Health	<a href="http://occupation.csmu.edu.tw/">http://occupation.csmu.edu.tw/</a>
China Medical University Dept. of Occupational Safety and Health	<a href="http://cmudosh.cmu.edu.tw/">http://cmudosh.cmu.edu.tw/</a>
Chang Jung Christian University Dept. of Occupational Safety and Health	<a href="http://www.cjcu.edu.tw/h-osh/">http://www.cjcu.edu.tw/h-osh/</a>
Kaoshung Medical University Graduate Program of Environmental and Occupational Safety and Health, Dept. of Public Health	<a href="http://ph.kmu.edu.tw/">http://ph.kmu.edu.tw/</a>

### 3. Center for Prevention and Treatment of Occupational Injury and Disease

- (1) National Taiwan University Hospital <http://www.ntuh.gov.tw/>
- (2) Taipei Medical University Hospital <http://www.tmuh.org.tw/>
- (3) Chang Gung Memorial Hospital, Linkou <http://www.cgmh.org.tw/>
- (4) Chung Shan Medical University Hospital <http://www.csh.org.tw/>
- (5) China Medical University Hospital <http://www.cmuh.cmu.edu.tw/>
- (6) Changhua Christian Hospital <http://www2.cch.org.tw/>
- (7) National Cheng Kung University Hospital <http://www.ncku.edu.tw/>
- (8) Kaoshung Medical University Hospital <http://cpod.kmu.edu.tw/>
- (9) Buddhist Hualien Tzu Chi Medical Center <http://hlm.tzuchi.com.tw/>

### 4. Relevant Organizations: some examples

- (1) Antidote Center, Chang Gung Memorial Hospital, Linkou <http://www.cgmh.org.tw/>
- (2) Antidote Center, Taipei Veterans General Hospital <http://www.pcc.vghtpe.gov.tw/>
- (3) Chinese National Federation of Industries (CNFI) <http://www.cnfi.org.tw/>
- (4) Industrial Safety and Health Association of the R.O.C. <http://www.isha.org.tw/>
- (4) Industrial Technology Research Institute <http://www.itri.org.tw/>
- (5) Labor Safety & Health Management Society R.O.C. [http://www.cshm.org.tw](http://www.cshm.org.tw/)
- (6) Safety and Health Technology Center (SAHTECH) <http://www.sahtech.org/>
- (7) Taipei Industrial Safety and Health Product Commerce Association  
<http://www.tishpca.org.tw/>
- (8) Taiwan Environmental and Occupational Medicine Association  
<http://www.eoma.org.tw/>
- (9) Taiwan Industrial and Mine Safety Health Engineers Association  
<http://www.tshe.org.tw>
- (10) Taiwan Occupational Health Nurses Association <http://tohnaorg.weebly.com/>
- (11) Taiwan Occupational Hygiene Association <http://www.toha.org.tw/>
- (12) Taiwan Occupational Safety Association <http://www.tosa.tw/>
- (13) Taiwan Safety Council <http://www.tsc.org.tw/>

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