

## GAP ASSESSMENT REPORT

### 1.0 Project Details

#### 1.1 Project Introduction

The project **Safety and Environmental Best Practices Exchange for Transportation of Hazardous Substances in the Industry (SAFE THAI)** funded by the European Union, under the Thailand – EC Cooperation Facility, commenced its operations in January 2009. The project aims to build the capacity of chemical & hazardous substances logistics companies in Thailand, by raising awareness on both EU Directives / Regulations & Multilateral Environmental Agreements (MEAs) relating to sound chemicals and hazardous goods / waste management. The Project attempts to bridge the gaps in the compliance of the local industry to international regulations, thereby strengthening the trade and investment flow between EU & Thailand.

#### 1.2 Project framework

The Project is divided into 4 distinct phases and each phase has very specific objectives as follows:

**Analyze Phase** – The First Phase seeks to identify the gaps existing in the level of understanding and practice of international regulations & industry best practices (EU & other multilateral environmental agreements) among the industry handling, storing, transporting chemicals & hazardous material in Thailand. This will in turn help identify topics to develop & deliver trainings on in the latter phases in order to address the gaps.

**Create Phase** – The Second Phase would seek to design & develop training material based on topics identified through the Gap Assessment in the previous phase.

**Deliver Phase** – The Third Phase would be the capacity building phase, where local trainers are trained and a set of technical, behavioral trainings are delivered to target groups. A special EU Conference which seeks to educate the target group on the relevant EU / International regulations is conducted.

**Mentor Phase** – The Fourth Phase would involve distribution of sustainability kits as an attempt to reach a larger target audience. Local trainers trained would be encouraged / guided to conduct further trainings and create the multiplier effect.

### 2.0 Gap Assessment

As a part of the Analyze Phase, the SAFE THAI Project Team conducted an Industry Survey followed by a Focused Group Discussion. Questionnaires were distributed to HASLA member companies as well as to other related industry sectors. Interviews of a smaller selected group were carried out in order to assess the existing gaps within the industry on awareness and practice of international regulations together with best practices in handling, storing & transportation of chemicals & hazardous substances.

## 2.1 Industry Survey

### 2.1.1 Survey Objectives

An Industry wide survey was conducted during the second half of February and first half of March with an aim to identify

- Level of awareness among the various players in industry about EU Directives / Regulations & Multilateral Environmental Agreements governing safe handling, storage and transportation of chemicals & hazardous substances
- To identify the level of preparedness &. degree of practise of international best practices
- To identify the training needs of the industry

A simple questionnaire with 26 questions was designed. It was circulated to over 100 people through e-mail and physical delivery. The target audience was chosen carefully to represent the various industry sectors for handling chemicals, transporting chemicals, storing chemicals, dealing with radioactive material, packaging chemicals & exporting chemicals. Some questionnaires were sent to academia and other industry associations. The Project Team was able to elicit responses from 60 participants. The survey results were compiled as a report.

### 2.1.2 Research Design

For the purpose of conducting the primary market research, the following research methods were used:

- Personal interview with industry experts
- Survey administered through e-mail, & physical despatch of questionnaire.

The team used the connections that HASLA has with the target audience and administered the survey during the various opportunities (seminars / meetings) that brought the target group together.

### 2.1.3 Key Insights from Survey

#### Composition & characteristics of respondents

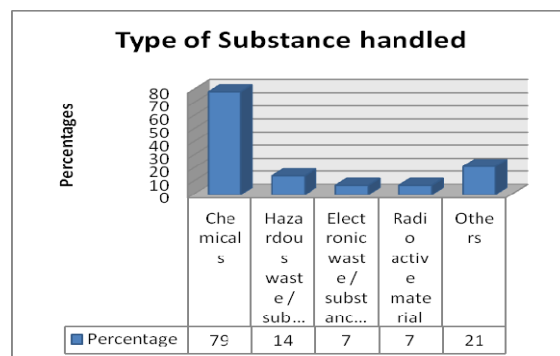
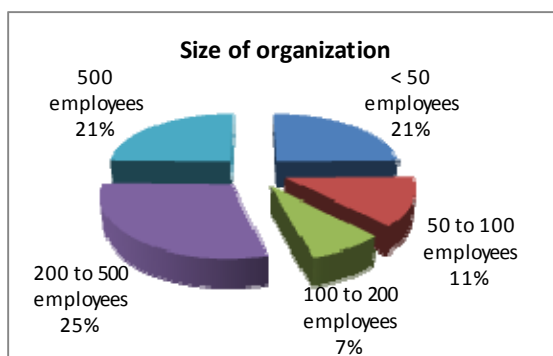
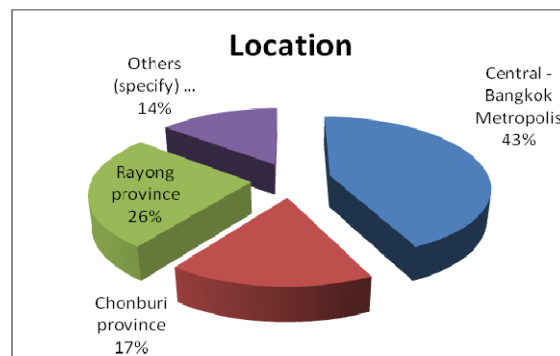
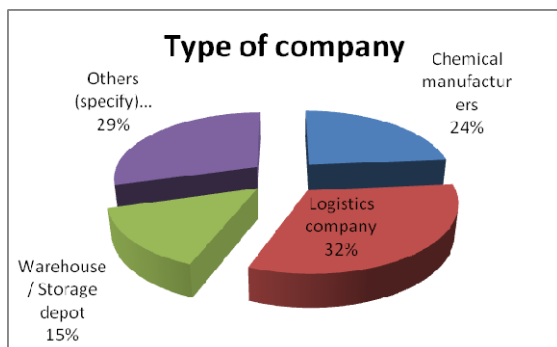
The analysis of the survey revealed that over 39 % of respondents came from logistics, 29 % from chemical manufacturers and 18 % from warehouse / storage. This is a good representation of people who use, handle and store chemicals and hazardous substances.

The analysis also revealed that over 43 % of respondents were from Bangkok Metropolis, 26 % from Rayong Province and 17 % from Chonburi Province. This again confirms the fact that the concentration of industries handling chemicals are located in Bangkok Metropolis and the Eastern Seaboard of Rayong and Chonburi, the specific target geographical areas identified by the SAFE THAI Project.

Respondents represented organizations of different sizes as follows - 21 % had employee strength of over 500 people, 25 % between 200 to 500 employees, 36 % had less than 50 employees. This fits in with the target groups of the Project of SMEs and SMIs.

The survey tried to elicit responses on what type of hazardous material the companies usually handled. The results revealed that over 79 % of these organizations handle chemicals, 14 % of them, hazardous waste, 7 % , electronic waste and another 7 % , radioactive material.

The survey had explicit questions to reveal the nature of the industry the companies represented. The survey findings revealed that 25 % of the respondents represented automobile, another 25 % electric & electronic industry, over 50 % came from industrial & food chemicals while 14 % represented agriculture pesticides & fertilizers.



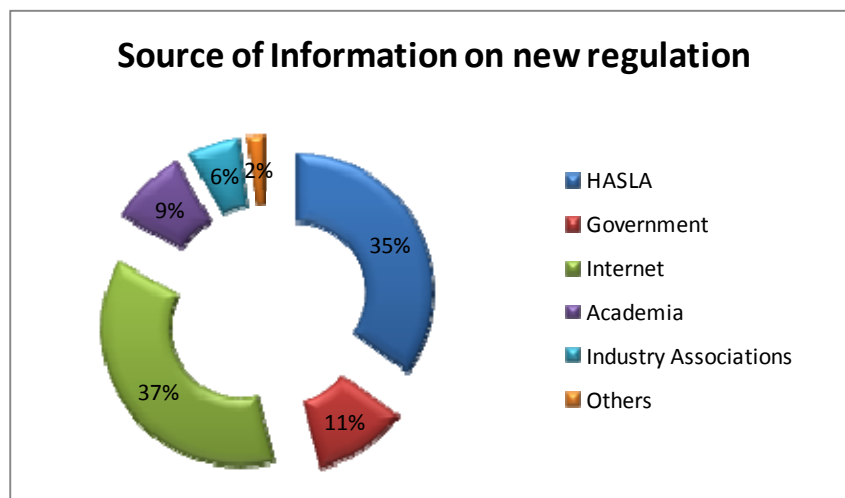
**Conclusion 1** – The survey reached a good representation of players who use, handle and store chemicals. The respondents represented organizations of various sizes, from different industry sectors. The results show a clear concentration of industries as identified in the SAFE THAI Project concept. This also gives valuable insight on the different types of international conventions / EU regulations that are most appropriate to Thailand based on the type of hazardous material handled and type of industry represented.

#### Study on awareness & trainings currently available

The Survey revealed that over 79 % of respondents have explicitly stated training budgets. This is a welcome sign, considering the nature of the industry they represent & the type of hazardous material they handle.

In an attempt to identify how much importance is given to trainings as a means to educate & influence behavior, questions regarding the frequency of training was asked. The results showed that 25 % of the respondents had annual trainings, 21 % had them once in 6 months, 25 % had them once every three months, and over 14 % had them every month.

Some of the interesting revelations from the analysis were that over 71 % of the respondents sourced their trainers internally, while 36 % sourced them from industry associations. It was also interesting to know that the majority of respondents depended on HASLA (57 %) and the internet (61 %) for information on any new regulations or any new developments within the industry (standards, best practices, others)



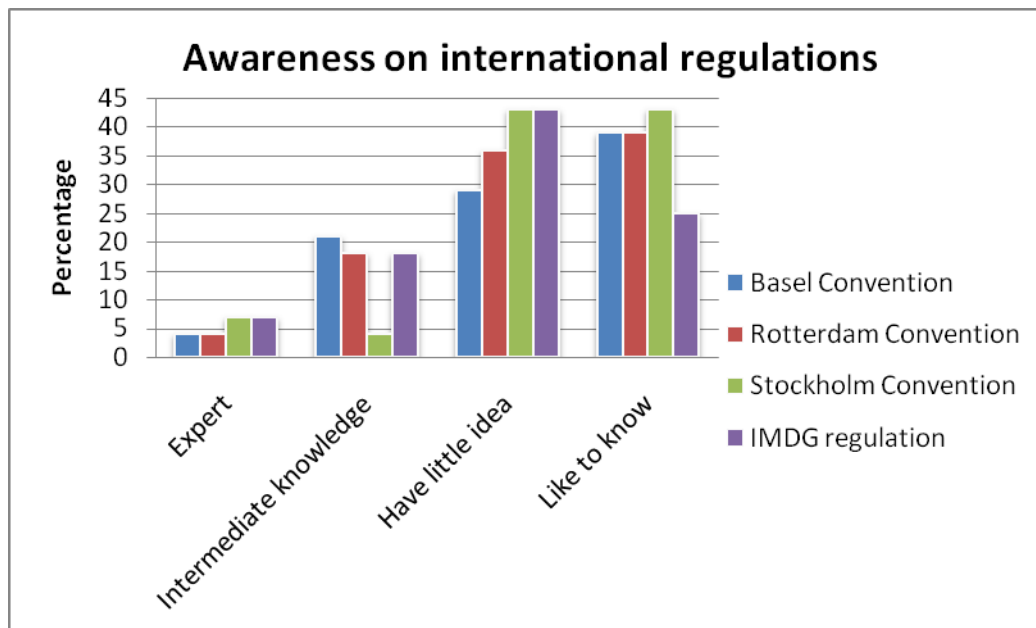
## Conclusion 2 –

Two significant interesting revelations emerged from the survey as follows: the presence of explicitly stated funds for training in the majority of companies; industry associations in general and HASLA in particular play an important role as source of information & trainers. These results clearly give us a picture of how SAFE THAI trainings would effectively reach the target industry through HASLA.

## Awareness on Multilateral Environment Agreements / international Regulations.

In an attempt to find out the level of awareness on international conventions / regulations on usage, storage & transportation of hazardous material, the survey asked the respondents to grade their level of awareness against these standards.

- 68 % had little or no idea about the Basel Convention on Trans-boundary Movement of Hazardous Waste
- 75 % had little or no idea on the Rotterdam Convention on Hazardous Chemicals, Pesticides in International trade
- 86 % had no idea on the Stockholm Convention on Persistent Organic Pollutants.
- 68 % had little or no idea on IMDG regulations
- 82 % had no formal training on IMDG Regulations for Transportation of Dangerous Goods.



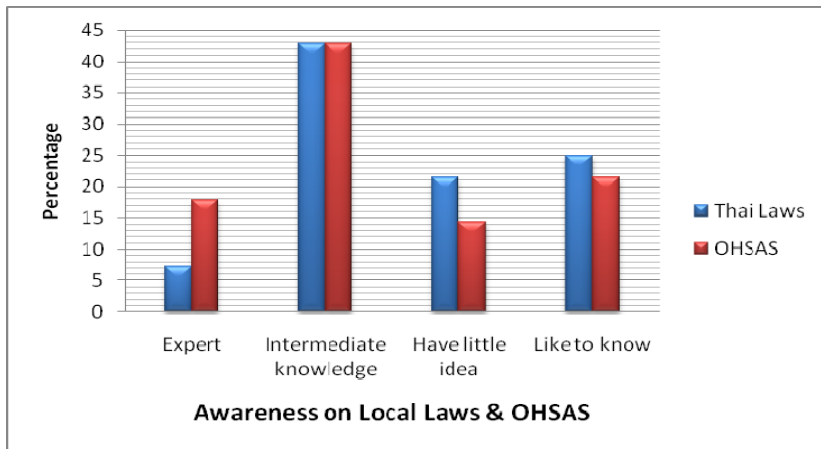
### Conclusion 3-

This survey clearly identifies the low level of awareness on international regulations (MEA & EU regulations) among the industry in Thailand. There is an impending imperative need to educate them on these through HASLA. The SAFE THAI Project would be able to raise this much needed awareness.

### A deeper look at other laws, industry best practices & standards

The survey was designed to elicit response on the level of awareness on local Thai laws on chemical handling, storage & transportation, level of awareness on general occupational health & safety standards and the level of preparedness of industry for emergencies. The findings were

- Over 50 % were experts or had intermediate knowledge on local laws governing chemical handling, storage & transportation.
- 68 % of the respondents had formal training in occupational health & safety standards.
- 79 % of companies had locally defined set of rules to handle emergencies and they varied in the frequency of drills to ensure preparedness (46 % annual, 14 % every 3 months and 11 % every month).
- Only 14 % of respondents had well-defined procedures for emergencies management & communication while 71 % of them had a set of general guiding principles.
- There was a mixed response when asked to rate hazardous material / chemical labeling & packaging systems in practice within the company - 25 % rated them in line with international standards, and over 58 % rated it in line with general and company guidelines.

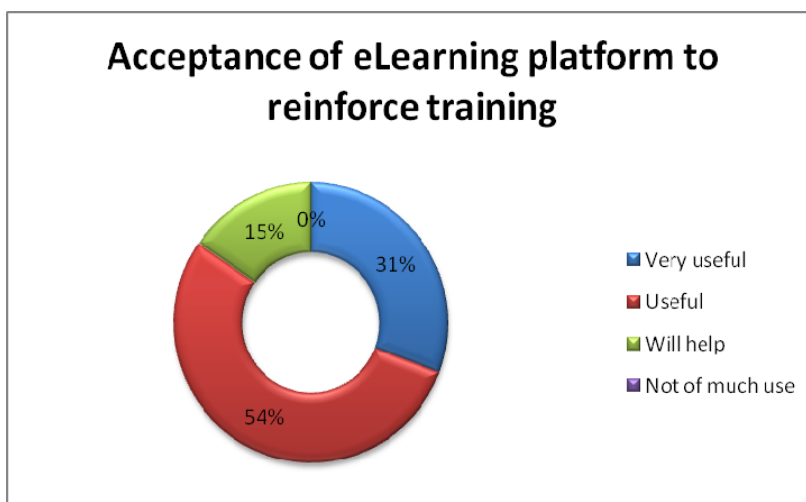


### Conclusion 4 –

The survey clearly identifies that companies are aware of the local laws and have good occupational health & safety practices. Most of companies have locally-defined rules to handle emergencies and also conduct drills to reinforce & influence the behavior of people on how to act during emergencies. However only a small percentage (14 %) of industries have well-defined hazardous communication procedures, while most (71%) of them have general guiding rules for the same. The inference from the survey results can be that the industry is now ready to move towards well-defined procedures for both handling & communicating emergencies.

### Use of eLearning as a medium to reinforce training

The survey confirmed the fact that e-learning (online or CBT) can be an effective means of reinforcing learning / training on new regulations, best practices any other developments. This is confirmed by the fact that 61 % look at the internet for information on latest developments (regulations & best practices) and that over 79 % of the respondents believed and e-learning platform would be very useful for reinforcing & sustaining trainings.



## Conclusion 5 –

e-Learning can be effectively used to sustain the Project initiatives to keep the target group informed about the various laws, conventions, best practices or standards and other related topics. The SAFE THAI Project Learning Portal and CBT will be developed to carry out this function.

## Training Needs Analysis

The Survey had explicit questions to identify the most relevant training needs of the target audience. At the same time, the respondents were also asked to identify who had to be trained on each topic.

The results stating the percentage of people who felt the training topic would be “very useful” or “useful” are summarized below

- Hazardous waste & hazardous chemicals – 68 %
- Hazardous substance labeling & packaging – 60 %
- Hazardous substance storage procedures - 82 %
- Safety precautions & defensive driving – 75 %
- International regulation on hazardous substance transportations – 72 %
- Emergency preparedness & response – 68 %
- Hazardous communication & critical injuries – 57 %

Attempts to identify the most relevant target group within the company for each of these training topics failed to give us any concrete details. This we believe is due to the fact that the target audience had little idea about latest developments and were not able to decide on which level within the organization would greatly benefit from these trainings.

## 3.1 Focused group Discussion

### 3.1.1 Introduction

After the industry survey, a focused group discussion was conducted on 12 March 2009. A group of 12 experts from chemicals, logistics, transportation and handling of hazardous substances, the Industrial Estate Authority, the Ministry of Transport, packaging, training service provider got together for a 4 hour focused discussion, which was moderated by Mr. Mongkol Phanthumkomol, SAFE THAI Project Manager & Ms. Sally Ananya Surangpimol, Project Partner Representative from Adelphi Research.

### 3.1.2 FGD Objectives

The focused group discussion was convened with an objective of discussing the current status of the awareness & practice of the international conventions/regulations/laws relating to the handling, storage and transportation of chemicals & hazardous substances in Thailand. The discussion was to help identify existing gaps in practices against local / international laws as well as validate the findings of the survey. The final goal is to pin down the training topics that would help bridge the identified gaps.

### 3.1.3 FGD Design

The design of the FGD is detailed below

1. **Initial Greeting & SAFE THAI Project Brief** - (5 minutes)- Moderator
2. **Discuss the Survey Findings (highlighting the need for trainings)**. - (10 minutes) - Moderator
3. **Discussion on Current status of** (45 minutes) – Discussion from Floor – coordinated by the Moderators.
  - Chemical & Hazardous Substance Handling
  - Storage & Warehousing
  - Transportation and Logistics.
4. **Discussion of available Best Practises / Conventions** (60 minutes) – discussion coordinated by industry experts & Moderators.

#### **Multilateral Conventions –**

(Basel Convention on Trans-boundary Movement of Hazardous Wastes & their disposal , Rotterdam Convention on Certain Hazardous Chemicals, Pesticides in International Trade, Stockholm Convention on Persistent Organic Pollutants & EU Directives / Regulations like WEEE, RoHS, REACH, etc)

**International Standards on Transportation** - International regulation on Hazardous Material Transportation, IMDG Regulation on Dangerous Goods

#### **Coffee Break**

5. **Identification of existing GAPS in industry & Trainings required** (60 minutes)-

Discussion from the floor coordinated by the Moderators.

Types of trainings needed in

- Behavioural Programs for ensuring safety.
- Technical Programs – (in handling, storage & transportation, communication, emergency preparedness etc...)
- Others

6. **Industry Best Practices** – (45 minutes) – Discussion from the floor coordinated by the Moderators on the following

Hazardous Waste Handling, Storage and Transportation,

Communication, Labelling & Packaging.

7. **Summarisation** – (15 minutes) - By Moderator

### 3.1.4 Highlights of the Focused group discussion

#### Definition of terminology in the Thai Context

The members of the FGD made an attempt to define / interpret what some technical terms used in the survey would mean within the Thai context. This was done in order to assist in interpreting and explaining the survey from a Thai industry perspective. .

**“Radioactive Material”** referred to by respondents are mainly material from medical testing; may include potentially hazardous chemicals from laboratories

**“Hazardous Waste”** categories need to be defined clearly especially what will constitute “Industrial Waste”; also the difference between hazardous “goods” and “waste”

**“Waste and Pesticides”** for the EU regulations, there may be a need to reach out to the Federation of Thai Industries (FTI) which has a big membership from the automotive and electronic industries. It may even be necessary to involve the Thai FDA (Food and Drug Administration) as under this category, the food and agriculture sectors are affected.

#### Important Gaps Discussed during the Survey

The group unanimously agreed that the Thai government has weak alignment of its regulations against other countries / international regulations.

EU regulations in place have different target groups and so it would be important to include a diverse group in the trainings.

The Thai educational system especially pre-university levels are not adequate in giving international perspectives to environmental compliance and sustainability issues

The need to actively involve the Industrial Estate Authority was felt as chemicals (including agro-chemicals) manufacturing and transport are concentrated in industrial estates in the Eastern Seaboard, especially Rayong.

#### Expansion of Scope

Ayutthaya, Lamphoon, Khon Kaen were identified as industrial estates where electric and electronic waste were concentrated. There was a recommendation for the SAFE THAI Project to reach out to these areas either during the project activities or during the multiplier effect / sustainability phase. .

It was identified that about 2,000 to 3,000 SMEs / SMLs from the warehousing sector would benefit from the SAFE THAI Project. .

Of HASLA 130 member companies, 60 are in chemical manufacturing; 20 are in hazardous goods transportation; 5 handle hazardous waste, mainly medical; 7 are tank manufacturers; others are testing, warehousing, consulting & training service providers.

With regards to packaging waste - HASLA members are mainly involved in bulk packaging e.g. lorries and tankers (for which there are existing regulations and enforcement in Thailand). Small packaging, such as drums and plastic containers, which are not yet adequately covered by HASLA or government regulations, need to be made part of the Project.

## Gaps in Existing Local Laws

It was pointed out that the Hazardous Substances Act in force in Thailand is 20 years old and it needs to be updated to reflect the realities of global trade.

It was also pointed out that the Hazardous Substances Handling Act is only 7 years old but mainly pertains to big volume movement and bulk storage. High risk sectors of importers, small packaging are not covered. The FGD also emphasize the big gap between local laws / standards and the laws / standards of industrialized countries like Germany.

It was identified that the definition of hazardous substances, especially mixtures of chemicals (versus single chemicals) is not clear in existing regulations in Thailand.

It was also discussed that the testing sector has fewer resources in terms of access to up-to-date global / local standards. In addition, information on accreditation guidelines and approved testing methodologies are not readily available or confusing. e.g. for heavy metals.

Controls for small packaging (e.g. metal, plastic drums) in Thailand are not good at present.

## Classification of Chemicals

Different systems governing chemical classification, like CAS number (Chemical Abstract System in USA), INECS in Europe, UN Number do not match with categories in Thailand. The need to either align or have a single system of classification was emphasized, so as not to confuse the industry.

## Interpretation of Hazardous Goods Storage Laws

The Department of Industrial Works adopted in April, 2008 a modified version of the guidelines in Germany for storage of hazardous goods for Thailand. Rules regarding classification of goods and implementation of guidelines apply right away to new factories but old factories are given three years to comply. Concrete feedback from the local industry confirms the difficulty in implementation due to confusion in understanding of the various terms and categories as well as the specific applications of the regulations to Thailand. The need for some form of training on this local law for factories involved in chemicals manufacturing and handling was felt, especially in the Bangpoo Industrial Estate.

## Gaps in the Packaging and Handling Industries

There is a huge gap between the small packaging and bulk packaging sectors, both in terms of material specifications to be used and certification (product, systems, personnel).

The packaging industry (usually but not always part of the manufacturing sector) has not made it mandatory for certified people to be used in operations for packaging & handling materials (chemicals as well as dangerous goods) Personnel certification is still done on a voluntary basis, compared to the requirements within the air transport sectors e.g. IATA requires a valid certification for 2 persons (handlers) in order to obtain a license to operate or continue to operate.

The absence of enough training institutes which can address IMDG requirements or any specific transport requirements for hazardous goods/waste, is a huge gap and it needs to be addressed. The International Transport Business School, Thai Air Freight Forwarders Association, Thai Airport Ground Services, Thai Airways hold training sessions but they focus on general transport or terminal operations only.

## Gaps in the Logistics industry

Roles & responsibilities of government agencies and specific authorization for overseeing inland waterways and rail transport are still not clear.

It was identified that most of the accidents occurs due to bad driving. The need to educate / train drivers was strongly emphasized. In relation to this, it was discussed that the present licensing of drivers does not specify what type of trainings and how many hours of training are required.

A need to amend the law to include “pick up trucks” used in transportation of chemicals / hazardous material under Type 4 licenses (those issued for 6 and 10 wheelers) was identified. Due to current classification of pick up trucks as cars, they are not covered under existing licensing laws / requirements.

The Factory Act puts the responsibilities on the consumer, end-user for enforcement and monitoring of drivers and trucks. There are gaps on enforcement and checks on vehicles / drivers by the government agencies. There are also currently no restrictions on the types and volumes (quantity) of goods that can be handled by each type of vehicle.

Gaps were identified with regards to the awareness for middlemen e.g. brokers, dealers. The lack of joint involvement by this group with manufacturers is another gap that needs to be addressed. .

## Awareness on Multilateral Conventions/ EU directives

Institutes like the Asian Institute of Technology as well as government agencies such as the Pollution Control Board, Industrial Estate Authority of Thailand, Department of Industrial Works have organized information sessions on international conventions like Basel, Rotterdam and Stockholm as well as other regulations, in the past. However, most of the sessions need to filter down to the operational level, in order to be understood and to be made more meaningful for people directly involved in operations.

Industry experts felt that Industry has very little information about EU directives and that many of them are fairly new. In particular, the directives on packaging waste and those on electric /electronic waste are of interest. The local industry sees a conflict in the UN code for packaging under TISI (Thailand Industrial Standards Institute) authority compared to the codes required to be used by other countries. It also felt that there is no harmonization of UN and local codes for imported packaging.

There are some discrepancies that require clarification in air transport codes and water transport codes.

## Best Practices in Thailand

In order to handle emergencies or crisis situations, the local industry got together to form groups such as CATEMAG (Chlor-Alkali Transportation Emergency Mutual Aid Group) to oversee health and safety issues; IEST (Industrial Emergency Safety Group). On the government side, the Ministry of Transport oversees local municipality-level assistance groups nationwide, which handle incidents involving oil and flammable materials. To effectively do so, the Ministry taps into networks with civic groups, hospitals and the police. These groups would come to aid in case of an emergency irrespective of which party is involved and whose jurisdiction it actually falls under. This is an attempt to manage crisis/ emergency situations nationwide. To date, there have been very good examples for handling incidents in the Samut Sakhon and Samut Prakan provinces, which are an extension of Bangkok Metropolis.

A Manual for Storage and Warehousing has been prepared for 400 factories in the Bangpoo Industrial Estate. Some representatives from companies operating in that area have been sent to Germany for training on various topics regarding storage of hazardous goods.

There are attempts to develop courses in labeling and packaging in cooperation with Japan. There are also joint efforts to cover basic to advanced topics on Occupation Health & Safety, with twenty-five trainers close to being certified and ten more selected to undergo training this year. There are plans eventually to cascade such training to develop certification schemes for trainers and practitioners.

There are also around 10 new courses being proposed to HASLA by various organizations and government agencies, such as UNITHA and the Thai FDA, covering topics such as Classification and Labelling of Chemicals, Comprehensibility Testing, Labelling of Pesticides and Agricultural Chemicals.

In an attempt to raise awareness on REACH and other EU directives, Chulalongkorn University has contacted HASLA with plans to organize seminars. Other initiatives where government agencies have reached out to HASLA include industry workplace safety (Department of Industrial Works), consumer safety (FDA), pesticides (Department of Agriculture), transport (Ministry of Transport). This type of cooperation has been beneficial to the local industry.

### 3.1.5. Planning of Training

The FGD raised the following related issues

Scheduling of training – it was suggested to hold training sessions, especially operational level training, simultaneously at two different locations – e.g. Bangkok and Eastern Seaboard or Rayong and Chonburi; for the conference on international conventions / EU regulations, Bangkok is preferred

Selection of trainers – it was suggested to obtain the CVs / resumes of trainers and international experts to make sure that qualifications and competencies match the topics and fulfill expectations.

### 3.1.5 Summary of FGD Findings

The focused group discussion helped identify the various gaps and loopholes in existing local laws in Thailand. The need for concrete efforts to bring about necessary policy changes was emphasized.

The FGD brought pointed out the need for harmonization of several laws including the codes for packaging/labelling, storage of hazardous goods, chemical classification, water & air transportation laws.

The need to cascade the relevant international & EU directives to operational level, then create mass awareness to those directly involved operations, in a way that is meaningful, was felt.

The need to educate drivers on safe /defensive driving was emphasized. The need for industry as a whole to receive training / continuing training on emergency management & emergency communication was likewise highlighted.

The FGD also identified some of the best practices in place to handle emergencies and some attempts made by HASLA to educate industry on industry best practices & regulations.

The idea to expand the scope of the SAFE THAI Project to include Ayutthaya, Lampoon, Khon Kaen provinces was proposed; ensuring matching of trainer competencies with subject matter was emphasized. It was proposed to develop some courses simultaneously in two different locations.

## 4.0 Training Topics Identified

Using the findings of the survey and based on the discussions of FGD, training topics have been identified are listed below:

### International Regulations

- Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal
- Rotterdam Convention on PIC (Prior Informed Consent) Procedure
- Stockholm Convention on POP (Persistent Organic Pollutants)
- All EU directives & regulations pertaining to handling, storage and transportation of chemicals and hazardous waste

### Behavioural Trainings

- Behaviour based trainings
- Defensive driving & importance

### Technical Training

- Hazardous waste & chemical handling basics
- Hazardous communication & critical injuries
- Emergency preparedness & response
- Hazardous waste & chemical storage basics
- Labelling & packaging – International Laws / standards
- IMDG regulation on Dangerous goods
- Occupational health & safety basics
- Local Thai laws on hazardous chemicals handling , storage & transportation – an overview

### Training of Trainers

- Training and Facilitation Skills Workshop
- Implementation of MEA Best Practices across Industry Sectors and Functions (Handling, Storage & Transportation).