DANGEROUS GOODS REGULATING SYSTEM IN SINGAPORE

Cui Yifang
School of Civil and Environmental Engineering, NTU

A/P Wong Yiik Diew
School of Civil and Environmental Engineering, NTU

Abstract—Dangerous Goods (DG), as its name states, can lead to serious consequences if improperly managed. Hence, a sound regulating system needs to be established to safeguard the handling of DG. In Singapore, many international and national rules and regulations have been implemented in the industry. Moreover, supportive initiatives have also been launched by various DG agencies to improve the DG regulation system in Singapore.

The present research shows that there exist incongruous opinions between industry companies and regulating agencies concerning Singapore’s DG regulation system. While industry companies aspired for a unified system with a single DG agency in charge to reduce the confusions that exists in the current system, the regulatory bodies on the other hand had their own well-founded reasons to retain the multi-agency system in Singapore as they continued to improve and delegate responsibilities clearly among key DG agencies.

A common message from the industry interviewees was that there is room to improve on the effectiveness of communication between industry and regulating agencies. The agencies shall endeavour to timely inform companies about DG developments such as web portal function updates and regulation updates.

Keywords—dangerous goods, regulating system

INTRODUCTION

Dangerous goods (DG), also called hazardous materials (HazMat), are radioactive, flammable, explosive or toxic substances and organisms in solid, liquid or gas forms [1] that can cause danger both to the public and the environment. As a result, there are a number of regulations covering safe transportation, storage and packaging of DG such as International Maritime Dangerous Goods (IMDG) Code and Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Explosives) Regulations.

Globally, DG is heavily regulated especially in Europe as it concerns the health and safety of the population as well as being environmental hazards. Moreover, DG can also become a terrorist weapon which could cause potentially dangerous situations with disastrous consequences.

In Singapore, DG carriers can be seen frequently on the roads with special signs indicating the specific class of DG on board. Since there is limited geographical space in Singapore, even approved DG vehicles transportation routes cannot avoid the closeness to the residents and central district areas. Furthermore, research shows an increase in frequency of accident occurrences in transportation of DG in Europe and North America regions ever since the beginning of 20th century to 2004 [2]. Singapore is also exposed to similar hazards from DG transportation and storage as its small land space yet relatively frequent DG transportation. The hub-and-spoke system that the port of Singapore has adopted requires an enduring, safe and secure transition of cargoes including DG which is a competitive advantage of Singapore port compared with the others. Therefore, the importance of a well-managed DG system is enormous. In order to safeguard the process of transport, storage and carriage of DG, several governmental agencies in Singapore have launched initiatives including various regulations and applied technologies to help the industry to build up a strong DG logistics chain. At the same time, the DG industry is also paying good attention to the handling process of DG.

The objectives of this study are to identify critical issues for DG regulating system in Singapore through a thorough literature review, and to gauge the usefulness and compliance status of DG regulations by assessing the logistics industry’s perceptions on the current regulation system for DG transport in Singapore.

The research is within the context of Singapore with focus on transportation and logistics of DG. Relevant regulations and supporting activities are reviewed and profiled; the compliance status and usefulness of regulations, as well as the future trends, are obtained from interviews and survey.

METHODOLOGY

Primary data for this study were collected through interviews and surveys. Logistics companies in Singapore which are involved in DG transportation or handling were contacted. Interviews were conducted with DG professionals in the logistics companies and DG agencies. Survey questionnaires were posted to DG logistics companies in Singapore. Survey questions were designed in accordance to the objectives of this study. Online survey was also administered on the survey targets.

Secondary data collection covered literature reviews of various resources such as databases, journals, books and internet. Secondary data are important to generate supportive evidences and comparison references for this research study.

LITERATURE REVIEWS

Various literature reviews were assessed in order to understand DG regulating system in Singapore, and
thus to identify the critical issues inherent in the system.

I. General System
Having adopted a number of international DG rules and regulations, Singapore has steadily improved its DG regulating system and is catching up on European countries. Mr. Jacobsen from Leschaco Pte Ltd observed, during an interview, that Singapore has made considerable progress for the past decade especially on the aspect of warehousing for DG [3].

In general, Singapore has established a relatively sound DG regulating system based on the various regulations and supportive activities promoted by several DG agencies. These regulations cover different aspects of DG transport and logistics which safeguard the DG transport chain within Singapore in air, land and ocean freight. As Mr. Foong from DHL has mentioned, Singapore enjoys a good international reputation with good ratings for quality, technology and extremely low corruption as well as good transportation infrastructure [4]. These are important considerations in the management of DG because it gives confidence to customers that DGs are managed in an efficient and effective manner with full compliance to international DG regulations.

II. DG Incidents in Singapore
Internationally, DG accidents occur most frequently in developed countries, especially on highways. The Major Accident Hazards Bureau (MAHB) in Europe was established for reporting and analysing DG accidents. In Singapore, as noted by several interviewees, the accident rate is low compared with other developed countries. This may be due to two reasons, one being Singapore’s limited landscape but more importantly, implementation of prevention measures and a well-established regulation framework such that possibility of accident occurrence is minimised. However, without an established accidents reporting system, accurate accidents data are not available for analysis. Mr. Heng of SCDF ascribed the principal cause of incidents to human negligence [6].

A strong emergency response programme is considered as critical for dealing with DG incidents. In Singapore, according to Mr. Kwok of SCDF, there are 4 Hazmat stations located at Alexandra, Jurong Island, Tuas and Tampines [7]. The Hazmat stations together with fire fighting stations and Company Emergency Response Team (CERT) form a strong emergency response team.

III. Primary Activities and Supporting Activities
Primary activities refer to the international and national regulations while supporting activities serve to strengthen implementation of the regulations. Main supportive activities discussed in this study are technology applications such as vehicle tracking devices and web portals, while other supportive initiatives are conferences and responsible care held and promoted by Singapore Chemical Industry Council (SCIC). The characteristics of the primary and secondary activities can be categorised as following.

- General rules and regulations
- Classification and labelling of DG
- Declaration of DG
- Emergency Management
- Licensing Control
- Health and safety of personnel

These categories of initiatives were surveyed by compliance status and usefulness, and the results are organised under Survey and Interview Results.

IV. DG Agencies in Singapore
The Singapore’s DG regulation system encompasses a multiplicity of agencies (Table 1) which can cause inconvenience for DG handling parties such as manufacturers, carriers and storage providers. Although each agency has clearly-defined roles and responsibilities, there are grey areas in the regulating system due to the complexities of DG properties that result in different standards.

<table>
<thead>
<tr>
<th>Table 1 DG agencies in Singapore</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main DG agencies</strong></td>
</tr>
<tr>
<td>Singapore Civil Defence Force (SCDF)</td>
</tr>
<tr>
<td>National Environmental Agency (NEA)</td>
</tr>
<tr>
<td>Singapore Police Force (SPF)</td>
</tr>
<tr>
<td><strong>Other DG agencies</strong></td>
</tr>
<tr>
<td>Ministry of Manpower (MOM)</td>
</tr>
<tr>
<td>Maritime and Port Authority of Singapore (MPA)</td>
</tr>
<tr>
<td>Health Science Authority (HAS)</td>
</tr>
<tr>
<td>Singapore Customs (SC)</td>
</tr>
<tr>
<td>Land Transport Authority (LTA)</td>
</tr>
<tr>
<td>SPRING Singapore</td>
</tr>
<tr>
<td>PSA</td>
</tr>
</tbody>
</table>

The perspectives of the industry towards the inconvenience inherent in multi-agency regulation system are discussed in the survey results. The scope of a compromise between the agencies and the industry is explored towards enhancing the efficiency of Singapore’s DG regulation system.

SURVEY AND INTERVIEW RESULTS

The survey and interview results are discussed in the following.

I. Survey Results
Most participating companies in the survey are involved in ocean freight, transportation and logistics and almost half of the respondents are handling all 9 classes of DG. The most commonly handled class of DG is class 3 which is flammable liquids. The survey obtained the following observations.

a. Most respondents agreed that the numbers of regulations, regulatory agencies and web portals in Singapore are about right.
b. There was contention regarding coverage of the regulations. One in four respondents perceived the regulations not fully covering all applicable DG issues. 42% considered comprehensive coverage while remaining 33% felt that there were duplications in some areas.

c. Half of the participants rated the regulations as being somewhat useful while the other half rated very useful. Most participants viewed web portals and the vehicle tracking devices as being somewhat useful.

d. Whereas an early study in 2006 indicated deployment level being lower than perceived usefulness level in various categories of activities launched by relevant DG agencies, the present study revealed comparable levels between deployment and usefulness levels, thereby suggesting improvements in the activities of the DG system in Singapore over the past few years.

e. All the R&D needs proposed to the respondents were viewed as important and urgent. These R&D needs included integrated DG regulation system, regulations for post-accident environmental protection, strong accident-reporting system and communication channel between regulatory bodies and industry for relevant DG information updates. In the 2006 study, overly-many DG agencies and weak communication in disseminating DG regulation updates were also rated as important weaknesses existing in Singapore.

II. Interview Results

The interview results further complement the survey results from industry and regulatory agencies.

a. Interviewees expressed a multitude of opinions regarding the multi-agency issue in Singapore. Interviewees who considered the number of agencies as being too many were principally concerned that there would be some repetition in the works to be done such as when applying for licences, submission of DG manifest, etc. Interviewees who considered the number of agencies as about right held the view that principal DG regulating agencies being the SCDF, NEA and SPF, should not thus pose any big problem. On the other hand, the agencies did not foresee any major change to the current framework, and they would continue strengthening the structure, and improving clarity each agency’s roles and responsibilities.

b. Interviewees had different perspectives regarding coverage of regulations. Some perceived grey areas that warranted further clarification by the agencies; some felt that there were duplications in coverage of regulations as well as responsibilities of the agencies. Moreover, as Mr. Jacobsen mentioned, comparing with Europe, Singapore still needs to establish more regulations, especially certain in-house practices. He suggested that Singapore should introduce mandatory appointment of a Dangerous Goods Safety Advisor, who is trained and certified based on the local and international rules and regulations, like the EU practice [3].

c. Interviewees suggested more educative information could be included in web portals for amateur to learn about DG on-line. Moreover, vehicle tracking devices are only installed on vehicles licensed to carry DG, and non-licensed DG carriers continue to pose threats.

d. There was general agreement about the lack of effective communication channel in the DG system. The industry may not have timely awareness of new updates in regulations or functions on the web portals, as a result, some inconvenience would arise.

e. The cost associated with compliance of regulations and deployment of technologies was considered relatively high by the interviewees, for example, the infrastructure cost and training cost. However, effectiveness, usefulness and safety considerations seemed more important than cost. Nevertheless, more cost-effective measures should be developed by the agencies for the benefit of the industry.

CONCLUSIONS AND RECOMMENDATIONS

The major findings from this study on Singapore’s DG regulating system are summarized as follows.

First of all, Singapore has an established DG regulation system encompassing different initiatives and agencies. However, as compared with European system, there is still space for Singapore to improve further. One major finding is that the industry’s claims of overly-many DG agencies in Singapore to regulate the system which lead to confusions and time consumption. The industry aspired for an integrated system to make transactions more effective and efficient such as when applying for various licences. Moreover, this can also help companies to reduce consultation times with different agencies when enquiring on DG issues. Contrarily, DG agencies stated that they had recognized the benefit of such system to industry and had discussions on this issue for the past few years. The agencies have decided to maintain a multi-agency framework whereby each agency has DG professionals to deal with specific kind of DG matters. Furthermore, there are only three major DG agencies namely SCDF, NEA and SPF, and they constantly endeavour to define division of roles among each agency clearly for the benefits of industry. The multi-agency approach involving each agency exercising responsibilities for specific DG issues shall be maintained in the foreseeable future.

Secondly, one important and urgent demand from the industry is effective communication with the authorities. Updates on the web portals or regulations may not be timely communicated to the industry thereby causing inconvenience and delay. Previously, it was SCIC playing the bridging role in bringing
industry and agency personnel together to share opinions and suggestions several times each year. One key initiative should be to promote and enhance connection between the industry and the regulatory bodies to facilitate the process of exchanging information and points of views.

Thirdly, by comparing the findings of the 2006 study by Mr. Rajkumar on DG logistics system in Singapore with this study [8], there has been better industry compliance with agencies’ initiatives as resulting from the continuous efforts put in by both the companies and the agencies to improve DG system in Singapore.

As for further R&D, one potential area is the harmonisation of DG classification system at an international level. As there are two sets of chemical classification systems defined by United Nations Recommendations on the Transport of Dangerous Goods (UNRTDG) and United Nations Globally Harmonised System of Classification and Labelling of Chemicals (GHS), international organisations do aspire and have intention to unify the classifications system so that there is less confusion. This would affect the national standards as many countries are complying with both UNRTDG and GHS. Moreover, Singapore port’s indigenous classification of DG, i.e. the PSA Classes 1, 2 and 3, which only apply in Singapore port may cause misunderstanding by shipper and carriers of DG, especially if they are unfamiliar with the system.

This research study has mainly focused on the internal factors, meaning the national situation. Future research study on DG regulating system should include more external factors such as comparisons with other countries’ DG systems. The advantages and disadvantages of the each country’s DG framework can be examined to find the gaps. By analysing both internal and external environments, the structure and content of Singapore’s DG regulating system can be further improved to achieve an even safer and more effective DG regulating system in Singapore.

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to the following people and organisations.

- Associate Professor Wong Yiik Diew for his valuable suggestions and instructions during the year’s research study.
- My collaborators Ms. Huang Min and Mr. Zheng Yanchao for their cooperation and support.
- Mr. Tan Kia Tang from Ministry of Manpower for providing the SCIC guidebooks, relevant DG acts and potential contact persons.
- Singapore Chemistry Industry Council for providing me a copy of guidebook and relevant web links.
- Mr. Hu Wing Ko from PSA for the information provided on the PSA classes.
- Mr. Uwe Jacobsen for providing the DG information and potential contact persons.
- Mr. Zhang Hongzhou for providing the piracy report.
- All the interviewees, Mr. Michael Foong from DHL, Dr. Roland Lim Yan Guan from SIMTech, Mr. Heng Keng Liang, Mr. Kwok Shun Yung and Ms. Alice Seto from Singapore Civil Defence Force, Mr. Ryan Lim from Schenker Pte Ltd, Mr. Tan Kia Tang from MOM, Mr. Michael Tang from Dangerous Goods Management Pte Ltd, Mr. Mohamed Salleh from LTH Logistics Ltd Pte, Mr. Uwe Jacobsen from Leschaco Ltd Pte, Mr. Terence Koh and Mr. Ooi Tiat Jin from SCIC, Mr. Martinn Ho from National Environmental Agency, Mr. Hu Wing Ko from PSA, and Mr. Razali from MPA for their patient explanation on the DG issues discussed in the report.
- All the survey respondents for their kindness in filling the questionnaire.

This report could not have been done without their generous contributions.

REFERENCES


