

CIRANO Note, written by Nathalie De Marcellis-Warin and Ingrid Peignier, October 2009

Industrial activity requires producing and using dangerous goods (DG), as well as transporting them between stationary facilities. Consequently, these materials are not only potentially a hazard on industrial sites, but also while being transported between them, when in storage at temporary holding facilities, and during loading and unloading operations. Certain choices with respect to storage in stationary facilities may introduce transportation-related risks. For instance, in order to comply with government regulation and policy in the area of risk management, stationary facilities could seek to reduce their stockpile of DG by increasing the number of deliveries and scheduling them on a "just-in-time" basis. Moreover, certain firms delegate some of their activities, especially transportation, to specialized contractors. These firms may, in turn, subcontract some portion of the work owing to capacity limitations. However, Canadian regulations governing the transportation of dangerous goods specify that the expeditor remains responsible for these materials until they are unloaded on the recipient's premises, even when transportation is assumed by a third party. In this particular case, outsourcing transportation does not correspond to a transfer of liability. Logistical choices in the matter of storage and transportation, the presence of several contractors owing to cascading subcontracts, and the fact that liability is not transferred, render any global risk management along the logistics chain quite challenging.

Representation of the DG logistics chain

Models of transportation and storage logistics chains typically draw on representations of the physical flow of products expressed in terms of volume, cost, or some other characteristic that is current in logistics. However, in our opinion an examination of the risk associated with DG cannot be limited to that dimension. Indeed, in the case of DG we consider it important to identify contractual flows representing interactions between the liabilities of the partners to the logistics chain: producers, transporters, intermediaries, and clients. A model developed at CIRANO allows both of these levels to be represented by following both the physical and the "administrative" chain and identifying all the actors as well as the associated contract risks.

Analysis of the results from a survey of practices of firms that use or manufacture DGs

When a questionnaire survey was conducted in the context of the GLOBAL research project, 106 firms responded (out of 490 contacted). Nearly half of the respondents represented either the chemical product or the petrochemical industries. Among the main trends reported we observe: high receiving/expediting frequencies (79.8 % on a daily or weekly basis); a preponderance of trucking (98.9 %); and the fact that 83.9 % of respondents in shipping are locked into their transportation mode. All firms use subcontractors (transportation [84 %], loading [33 %], and unloading [31 %]). A number of respondents indicated that a transportation accident involving their subcontractor would have either no impact on their firm (16.1 %), or less impact than an accident involving one of their own vehicles (37.9 %). The most frequently mentioned impacts of a DG accident would be the immediate direct cost (88.3 %), damage to the corporate image (68 %), foregone production (65 %), public reaction (61.2 %), and higher insurance premiums (61.2 %). However, many firms have no long-term contract and do not perform safety audits of their subcontractors.

Ongoing survey of DG transporters

A survey of DG transporters is currently being conducted to provide the basis for developing an analytical grid for selecting a transporter. The grid should help firms make logistical choices as a function not only of cost but also of many other organizational criteria that fall under the heading "risk." A thoroughgoing analysis of these two surveys will yield a clearer understanding of the logistical strategies of firms throughout the DG logistics chain and equip them to ensure improved global risk management.

Note: The GLOBAL research project was launched by INERIS (France) and ended in 2008. DG remains a focus of research at CIRANO. Our main partner in this area is the Ministère des transports du Québec. For more information, some reports from the GLOBAL-Québec project are available on our Site. A book, "Stratégies logistiques et matières dangereuses," will be published by Presses internationales Polytechnique under the direction of N. De Marcellis-Warin and M. Trépanier.