Transport Canada | Transports Canada

TRANSPORTATION OF DANGEROUS GOODS NEWSLETTER

We invite you to read the 2021 edition of the Transportation of Dangerous Goods (TDG) Newsletter. This issue includes articles on some of the topics that have kept the TDG Directorate busy during the last few months.

INSIDE

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Canada

SURVEY

To continue delivering content that is relevant to your interests, we prepared a short survey where your feedback is the driving force for improving future editions.

We look forward to hearing from you!

WORD FROM THE DIRECTOR GENERAL

Author: Benoit Turcotte

I am pleased to introduce this edition of the Transportation of Dangerous Goods (TDG) Newsletter. This edition will highlight some of TDG's latest achievements.

As you will see, the TDG Directorate is making progress on a number of key files, as evidenced by articles in this edition.

New Oversight Solution

I would like to share that the development of TDG Directorate's new oversight solution is done. Over the past few years, the TDG Core team has been gathering feedback on the existing Inspection Information System (IIS) and the message was clear – a new oversight solution was needed. Following a vote by TDG Directorate employees, the new oversight solution was named: Regulatory Oversight Management (ROM).

The TDG Directorate is happy to report that ROM is not only live and operating, but the application has been a huge success, and we have marked a new milestone for TDG: IIS has been decommissioned after supporting over **25,000 TDG inspections** over the last decade.

ROM includes the following features:

- Tools for scheduling and planning inspections, as well as follow-up activities
- Integration with Microsoft Office 365
- Facilitation of assessment with the integrated SEAT
- Generation of Inspection Reports as well as Enforcement and Safety Actions
- National Oversight Plan
- Time Tracking
- Mobility (Operating in Disconnected Mode)
- Questionnaire Enhancements

All TDG inspectors are now active in ROM, and training has been delivered to all users. Ten (10) multi-day virtual training sessions were delivered with high attendance and support from the TDG Core team. Training material has been published in both languages, including a comprehensive user guide.

The feedback from inspectors has been positive, and the TDG Core team continues to offer support for any issues that users experience through the Support Request feature in the application.

I am convinced that this new application will play a large role in helping Transport Canada and the TDG Directorate move towards a modern, digital-first oversight environment.

TDG Audit

Finally, I would like to mention some key milestones regarding progress on the TDG Directorate's response to the Commissioner of the Environment and Sustainable Development (CESD)'s follow-up audit of the TDG Directorate (2019). In order to respond to the CESD's five (5) recommendations, TDG has created a Management Action Plan to better co-ordinate the initiatives that will be carried out over the next 24 months. As of October 2021, TDG has:

- Improved data control processes and procedures to confirm compliance, all inspectors trained and managers verifying compliance on a quarterly basis.
- Updated the Inspector Information System (IIS) User Guide to align with the new Procedures on follow-up to non-compliance.
- Successfully implemented ROM (see above), which will play a significant role in our ongoing efforts to address the audit findings.
- Removed 1,993 closed dangerous goods and means of containment (MOC) facilities from TDG databases in 2020–2021.
- Implemented new procedures for follow-ups of non-compliance.
- Status of compliance documented in 99% of files at the end of Q4.
- Developed process to send renewal and expiry notices by email on a monthly basis to all registered Means of Containment (MOC) manufacturing and design facilities. MOC facilities with expired certificates that cannot be verified are now subject to on-site verification under TDG's National Oversight Plan.
- Acquired and implemented an online tracking system for Emergency Response Assistance Plans (ERAPs), known as ERAP Online Services (EOS), that ensures conditions for approving ERAPS are met, and that they do not stay "interim" for longer than absolutely necessary.
- Developed new guidance material for Remedial Measures Specialists to assess ERAP applications, as well as necessary training.

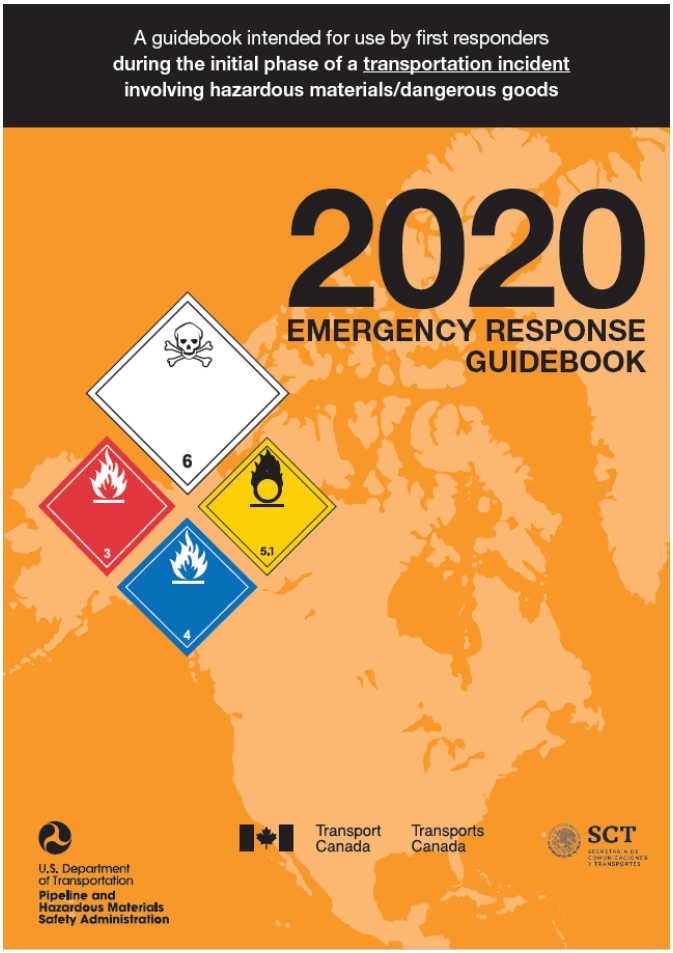
Moving forward, TDG will continue to make itself more effective, efficient, and agile as a regulator through these special initiatives, while continuing to fulfill its core mandate.

I hope you find some valuable information in this edition, and wish to thank you for your continued support as we work together to promote the safe transportation of dangerous goods together.

As a side note, this edition will be the only one for the year 2021.

2020 EMERGENCY RESPONSE GUIDEBOOK TRAINING PACKAGE

Authors: Anne Champagne and Natacha Paquette



In September 2020, the Emergency Response Guidebook (ERG) 2020 was officially released by Transport Canada (TC). As of October 2021, the CANUTEC team has already sent out over 61,000 copies to Canada's first responder community.

You don't know what the ERG is?

It's a guidebook that was created to help firefighters, police and other emergency personnel in the first 30 minutes of an incident involving dangerous goods being transported by road and railway.

Responders can use it to quickly identify specific or general dangers associated with the material(s) involved, and to protect themselves and the public during their initial response.

CANUTEC, which is TC's Canadian Transportation Emergency Centre, is extensively involved in producing this guidebook with the collaboration of the United States' Department of Transportation, the Secretariat of Transport and Communications of Mexico, and the Centro de Informaciòn Quìmica para Emergencias (CIQUIME) in Argentina.

The guidebook is published in English, French and Spanish, and is available as a paper version, a web-version, a downloadable desktop version, a mobile App, and a PDF document.

If you need help in figuring out how to use the ERG, CANUTEC created the **ERG training Package** which is composed of four (4) PowerPoint presentations to assist you.

Here is a brief overview of what these four (4) presentations are:

Part 1: How to use the ERG

This first presentation will explain in detail how each of the coloured sections of the guidebook works. This presentation will give you an overview of all these sections and how to use them. It is highly recommended that you familiarize yourself with the ERG before you arrive at an incident involving dangerous goods.

After you have learned about all the different sections, Part 1 of the training package will provide you with training scenarios that will demonstrate how to use the flowchart, which was first introduced in the ERG 2016 and can be found at the beginning of the ERG.

Part 2: Additional Scenarios

To help you even more, CANUTEC created additional training scenarios that involve tanker trucks and railcars which are on fire or simply leaking. You also have leaking totes and drums and other surprises! Your task will be to figure out how to gather the information from the ERG.

Part 3: New features in the ERG2020

As the title mentions, this presentation lists all the changes made since the last edition of the guidebook (ERG 2016).

In case you were not aware, the guidebook is published every four (4) years to reflect changes in emergency response procedures and also to update material names and UN numbers.

Part 4: Scenarios presented during Athena Exercise in Lévis, QC, 2017

If you didn't have enough scenarios within Part 1 and Part 2 and you are craving for more, well Part 4 is for you!

If you are wondering what Athena Exercise was, it was a train derailment exercise held on February 25–26, 2017 at the Institut Maritime du Québec in Lévis, Quebec. The main goal of the exercise was to assess Canada's response to incidents involving flammable liquids transported by rail, and identify gaps and areas for improvement.

These four (4) presentations were created by CANUTEC staff and are available to anyone who uses or trains others to use the Emergency Response Guidebook. And you are allowed to edit these presentations if needed.

To get a copy of the ERG 2020 training package, please email CANUTEC: canutec@tc.gc.ca.

For more information about CANUTEC and to access various formats of the ERG 2020, please visit the CANUTEC website.

Other useful information is available on the website. For example, did you know that CANUTEC has an ERG 2020 Training Video? No? It's a short eight (8)-minute video that explains how to use the ERG.

The page Understanding the Emergency Response Guidebook will help you better understand some of the more complex instructions in the guidebook and to learn the difference between nuanced terms.

Furthermore, CANUTEC works hard in producing the most up to date guidebook, however, errors may occur. In this case, you will also find on our website the corrections to the guidebook.

CANUTEC – DANGEROUS GOODS DATA

Author: Jean-Philippe Morency

CANUTEC deals yearly with thousands of emergencies encompassing dangerous goods of all classes, transported by all modes. For the last four (4) years, Petroleum Crude Oil (UN1267), diesel (UN1202), and liquefied petroleum gases (UN1075) have been the most common dangerous goods involved in the emergencies reported to CANUTEC.

While the total number of emergencies in 2017, 2018 and 2019 remained between 2850 and 2950, CANUTEC intervened in only 2320 emergencies in 2020, presumably prompted by a slowdown of the dangerous goods demand and transport, due to the COVID-19 pandemic. Up to November 2021, CANUTEC was involved in 2021 emergencies.

In 2020, of the 2320 emergencies in which CANUTEC was involved, about a quarter were related to class 3 dangerous goods (flammable liquids) and another quarter were included in class 8 (corrosive liquids). Almost 15% of incidents were class 2, gases. The least common classes were class 7, Radioactive Materials, and class 1, Explosives.

Counter-intuitively, almost a third of all 2020 emergencies were incidents categorized as "non-transport", meaning that these emergencies required the assistance of a scientist trained in hazardous materials emergencies, but the dangerous goods were not in transport at the moment of the incident. For example, a warehouse manager called to remediate a spill that occurred during handling, or a fire department contacted CANUTEC for scientific support after some pool chemicals were mixed at a private citizen's house. CANUTEC has solidified itself as a reputable entity to provide Canadian first responders and private citizens with fact-based information to help in the initial stages of an incident involving dangerous goods.

A good example of a frequent non-transport incident is an incident involving broken mercury thermometers that take up the fourth place for incidents in which CANUTEC participated by combining Mercury (UN2809) and Mercury Contained in Manufactured Articles (UN3506). Poison control centres throughout Canada regularly refer private citizens to CANUTEC for help on the matter.

It is worth mentioning that almost an eighth (225, or 12.2%) of all emergencies were simulation scenarios. These exercises are conducted by fire departments, emergency services, manufacturing and training facilities. CANUTEC can also assist stakeholders with planning exercises in advance, ensuring that the training is efficient, and incorporates as many realistic elements as the trainer/trainee would like.

ADOPTING A COMPETENCY-BASED APPROACH TO TRAINING AND ASSESSMENT

Authors: Natasha Prince and Lisa Tellier

High number of reported non-compliance

Transport Canada's (TC) Transportation of Dangerous Goods (TDG) Directorate oversees how dangerous goods are handled and transported across Canada. This involves conducting risk-based oversight in an effort to prevent any activity that may compromise public safety.

The *Transportation of Dangerous Goods Regulations* (TDG Regulations) requires that anyone who handles, offers for transport, or transports dangerous goods be adequately trained and hold a valid training certificate. Currently, "adequate training" is defined as a person who has sound knowledge of all the topics directly related to their assigned duties. However, previous consultations on training revealed that some stakeholders felt the term leaves room for interpretation.

Although most industry training aligns with the current requirements in the TDG Regulations, dangerous goods training continues to be one of the most reported areas of non-compliance in the TDG regime. An estimated 23% of these violations relate to stakeholders performing tasks for which they were not trained. Since the safe transportation of dangerous goods relies heavily on well-trained persons, training for those who handle and transport dangerous goods has been a key area of focus for TC.

Training requirements on an international level

Dangerous goods training in Canada acknowledges international training requirements that are incorporated by reference in the TDG Regulations, including the International Maritime Dangerous Goods Code (IMDG), the United Nations Model Regulations, Title 49 of the Code of Federal Regulations and the International Civil Aviation Organization (ICAO) Standards. Currently, these codes require that persons who handle, offer for transport and transport dangerous goods receive training commensurate with their responsibilities, which must include both general awareness training and function specific training.

What we heard

TC has been engaging with stakeholders since 2016 on training requirements in the TDG world. Some of the key points raised during these consultations were:

- TC should ensure that any proposal would not result in significant administrative burden and that our expectations be clearly communicated to the regulated community;
- Seeing that Canada shares a border with the United States and a lot of dangerous goods cross this border, we should continue to have alignment between Canadian and foreign carriers;
- Provide greater clarity for self-employed persons;
- The proposed method should not be overly prescriptive; and
- An enforcement strategy should be clearly outlined and consistent across Canada.

Improving Canada's dangerous goods training

TC is proposing to amend the current training requirements by adopting a competency-based training and assessment (CBTA) approach. In line with international requirements, the CBTA approach would incorporate aspects of general awareness and function-specific training and serve as a performance-based approach that focuses on the outcome (competency), rather than prescriptive methods like prescribing the number of hours of training required. Competency-based training is deemed successful when employees demonstrate they have acquired the necessary "knowledge and skills to perform their functions safely and efficiently".[1]

1 ICAO Safety. New training provisions for the safe transport of dangerous goods by air. https://www.icao.int/safety/DangerousGoods/Pages/NewTrainingProvisions0630-4506.aspx

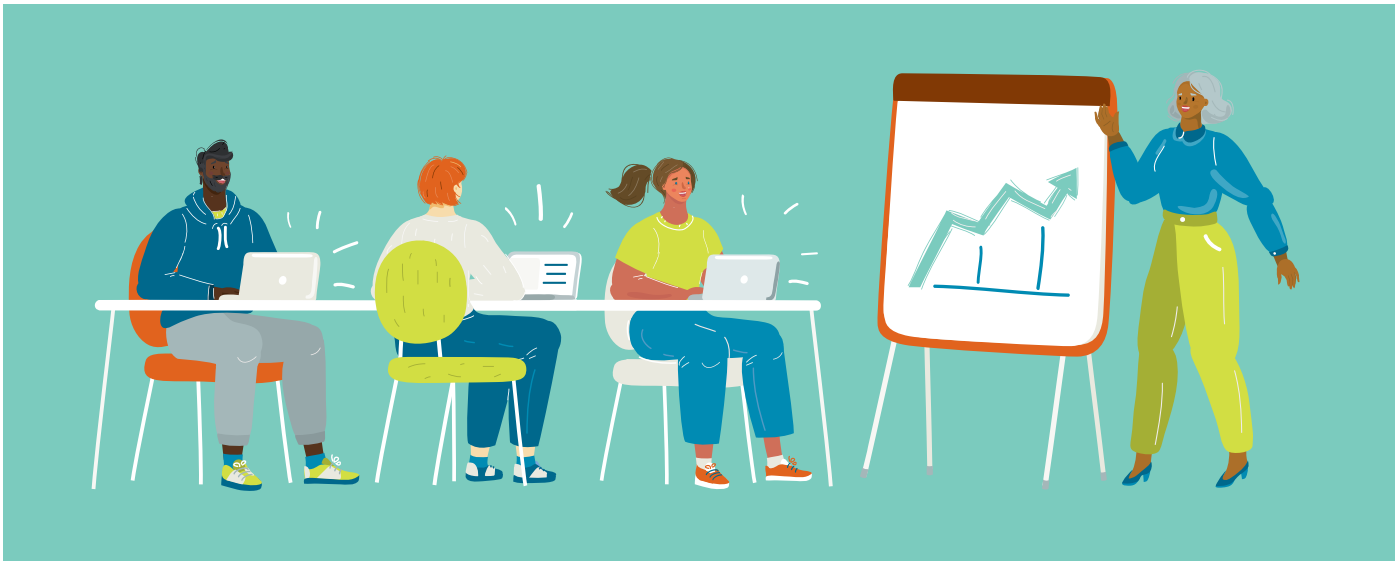
The CBTA method will be adopted through the CGSB standard: CAN/CGSB-192.3-2020 "Transportation of Dangerous Goods Training, Assessment and Competency Standard", which will be incorporated by reference in the TDG Regulations. The new training standard was developed by TDG experts from industry, training organizations, and government. The CAN/CGSB-192.3-2020 standard was published online in November 2020 and sets out the requirements for general awareness and function specific training and assessment for persons handling and transporting dangerous goods by road, rail, marine, and air in Canada.

Canada would be the first country to adopt CBTA as a mandatory approach in its transport of dangerous goods regime. However, the requirements for CBTA would align, to the extent possible, with the international codes mentioned above. The ICAO Dangerous Goods Panel has adopted a CBTA approach and has released the first edition of their Guidance on a Competency-Based Approach to Dangerous Goods Training and Assessment online in December 2020,[2] thereby explicitly requiring in their ICAO Technical Instructions (TIs) that employees must be competent to perform their tasks starting January 1, 2023.

How we will help industry

Moving forward with a CBTA approach for persons who handle, offer for transport and transport dangerous goods would provide greater clarity to TC's regulated community on the department's expectations. The requirements to achieve competency are outlined in the new CGSB-192.3-2020 training standard. Having a standard will serve not only to clarify training requirements to industry but would be an objective tool for inspectors to measure compliance.

To facilitate the rollout of the standard, TDG Directorate hired the firm Human Resources Systems Group[3] (HRSG) specializing in CBTA to develop, with stakeholder participation, guidance materials based on the requirements of the new standard. These tools include examples of CBTA documents such as activities for typical TDG jobs and performance criteria that stakeholders can use to revise their own training programs. These tools are designed to support stakeholders that may not have the resources to hire trainers or access to the expertise necessary to build their own training programs. These tools are expected to help minimize the burden on those businesses.



2 Guidance on a Competency-based Approach to Dangerous Goods Training and Assessment. https://mailchi.mp/newsletters.icao.int/10147?e=5160bbb9db

3 Competency-Based Talent Management Solutions | HRSG www.hrsg.ca

INCIDENT RESPONSE DURING COVID-19

Author: Jean-Marc Mazerolle

Onsite during a pandemic

Deploying to a train derailment that includes dangerous goods is a stressful event. If you add to that a global pandemic, plus a derailment site in a lock down zone due to an outbreak, you have the makings of a tough day at the office!

This is the exact scenario that took place in Edmundston, New Brunswick (NB) on January 26, 2021. The derailment contained 22 railcars in a pile-up, with 3 cars each containing approximately 120,000 litres of Liquid Petroleum Gas (LPG). When the derailment took place, NB was experiencing a spike in COVID-19 cases. Moncton, where the Atlantic main office is located, was in the Red Phase of restrictions. Edmundston was in a full lock down phase.

What to do? Julie Dupuis, the Atlantic Region's Remedial Measures Specialist (RMS) was ready to spring to action. Many discussions were held with the management team, and first responders on the ground. Initial reports were that there were no leaks, none were anticipated, and that the means of containment were quite intact.

There was good communication between Transport Canada (TC) and the First Responders onsite. It was decided that Julie wouldn't be deployed right away, but that everyone would monitor the situation.

A little less than a day into the event, it became clear that the accident site was quite complex, as the photos show. While crews worked to re-open the rail line, it was critically important that the railcars be moved with care and attention. It was also difficult to access the LPG railcars, due to their location in the pile. The decision was made to deploy the RMS to the site to assist.

Discussions were held as to where to stay. Should the hotel be nearby, to minimize travel time, or outside of the lock down zone to minimize COVID-19 risk? The initial thought was to stay outside of the lock down zone, but once it was understood that the 24/7 nature of the clean-up would mean long hours, additional travel time would add another hazard to the mix. The closest hotel was booked.

After a late-night travel to the site, the RMS arrived at first light. To minimize COVID-19 risks, an N95 mask and a cloth mask were worn while onsite. Large amounts of hand sanitizer were used during the deployment.

The derailment occurred very close to NB Provincial Route 120. The NB provincial Emergency Management Office (NBEMO) closed the road for a period of six days to ensure the safety of both the public and the emergency responders working on site. The Royal Canadian Mounted Police (RCMP), Canadian National (CN) employees and the Baker Brook fire department arrived almost immediately after the derailment.

Dangerous goods subject to an Emergency Response Assistance Plan (ERAP), such as LPG over 3000 L, are considered a greater risk for harm and require technical expertise and specialized equipment. Three (3) specialized emergency response companies listed in the ERAP arrived on site within four (4) hours of the derailment. CN and Emergency Response Assistance Canada (ERAC) each deployed two dangerous goods specialists from Quebec and Ontario. Representatives from the NB EMO and the NB Fire Marshal Office were also present. An Incident Command System (ICS) was implemented in order to facilitate clear and concise communication between the different organizations involved with the remedial operations.

A damage assessment, conducted by the emergency response specialists, determined that the integrity of the railcars was not compromised by the derailment. The railcars were carefully removed from obstructing the rail line by a specialized Montreal-based rail crane company. CN employees were able to fix and open the rail line within approximately 14 hours of the derailment.

The remedial operations started with the transfer of one (1) railcar to three (3) receiving highway tanks. The response teams quickly realized that the rail to highway tank transfer was very time consuming. CN dangerous goods officers (DGO) were able to secure two (2) receiving railcars and negotiate adequate rail line closure to conduct rail-to-rail transfer. During the night of January 29th, 2021, the rail line was closed and the rail-to-rail transfer of the two (2) remaining full railcars was successfully completed. All the dangerous goods railcars were purged and flared to reduce the internal pressure and to burn off residual gas. The railcars were then wrecked on site and sent to a scrap metal facility.

Julie kept in constant contact with the team back at the regional headquarters, providing regular updates, in addition to CANUTEC updates.

The incident generated a few lessons learned for deployment during a pandemic:

- Multiple lockdown phases increase the complexity of deployment logistics (hotel location, meals, washroom locations, etc.). This event would have been even more complex had provincial borders been involved.
- Critically important that Headquarters and the Region communicate effectively during all phases of the event.
- Difficulty in following COVID protocols: as an example, some responders onsite, due to the level of noise, would lower their masks and lean in when communicating.
- Importance of having adequate Personal Protective Equipment (PPE) on hand, ready for quick deployment.
- Importance of re-evaluating and revisiting decisions made throughout the event.

All in all, and despite the challenges, the event response progressed smoothly due to the professionalism and hard work of the RMS and all others involved.

"FINE FUND" RESEARCH PLAN

Author: Amy Park

The Transportation of Dangerous Goods (TDG) Directorate's Safety Research and Analysis (SRA) branch has developed a plan to initiate 23 new research projects from 2020 to 2023, with $3.6 million received through court settlements from convictions under the *Transportation of Dangerous Goods Act*, 1992 (TDG Act) following the Lac-Mégantic tragedy. Such funds are informally referred to as the "Fine Fund".

In 2020, the Minister's office announced the research plan in a news release.

These 23 research projects will inform the development and improvement of safety marks, safety requirements, and safety standards for the transportation of dangerous goods in Canada.

- Comprehensive review of the **criteria and thresholds for emergency response assistance plans** (ERAPs) in the *Transportation of Dangerous Goods Regulations* (TDG Regulations)
- Validation of recommended **emergency actions for liquefied natural gas** (LNG) in the Emergency Response Guidebook (ERG)
- Evaluation of any increased **risks** resulting from greater amounts of **hydrogen** being transported to hydrogen-vehicle fuelling stations
- Hazard assessment of **energy storage systems** being transported **in enclosed vessels** for marine transport
- Development of a **geographic-information-system (GIS) based risk assessment** methodology for the transport of dangerous goods by road
- Development of a **smart package for lithium battery** transportation that indicates a warning about an issue inside the package
- Validation of upcoming new United Nations requirements for **fibre-reinforced plastic (FRP) portable tanks**, to consider for adoption in North America
- Analysis of considerations for the development of **TankFax**, a database of vehicle histories of highway tanks, in Canada
- Contribution to the development of and testing for revised United Nations **classification criteria for lithium batteries**
- Analysis of the reasons for regulatory **non-compliance in the transport of lithium batteries**
- Analysis of and potential uses for shredded waste from **used explosives packaging**
- Development of requirements for a new standard for **flexible fabric tanks for the aerial transport of fuels**
- Evaluating the applicability of damage assessment criteria for pressure tank cars towards **damage assessment for general-service tank cars**
- Safety analysis of **stranded energy in a lithium-ion battery** pack
- Review of the **recommended distances for boiling-liquid expanding-vapour explosions** (BLEVEs) in the ERG
- Consideration of **human factors in TDG training requirements**
- Evaluation of American Society of Mechanical Engineers **(ASME) *Boiler and Pressure Vessel Code* Section XII** requirements for the manufacture and continued service of highway tanks in Canada
- Determining the **status of the hydrogen storage system after a vehicle fire**, so that the damaged hydrogen storage system can be transported safely using the appropriate post-fire handling measures
- Evaluation of **CG-7 pressure-relief devices for cylinders**, to consider the possible extension of the requirement for replacement/re-test within ten (10) years of the date of manufacture
- Collecting data on **steels used for the manufacture of highway tanks**, for **damage assessment purposes**
- Review of **penetration failures in past vent-and-burn** procedures, and consideration of possible solutions

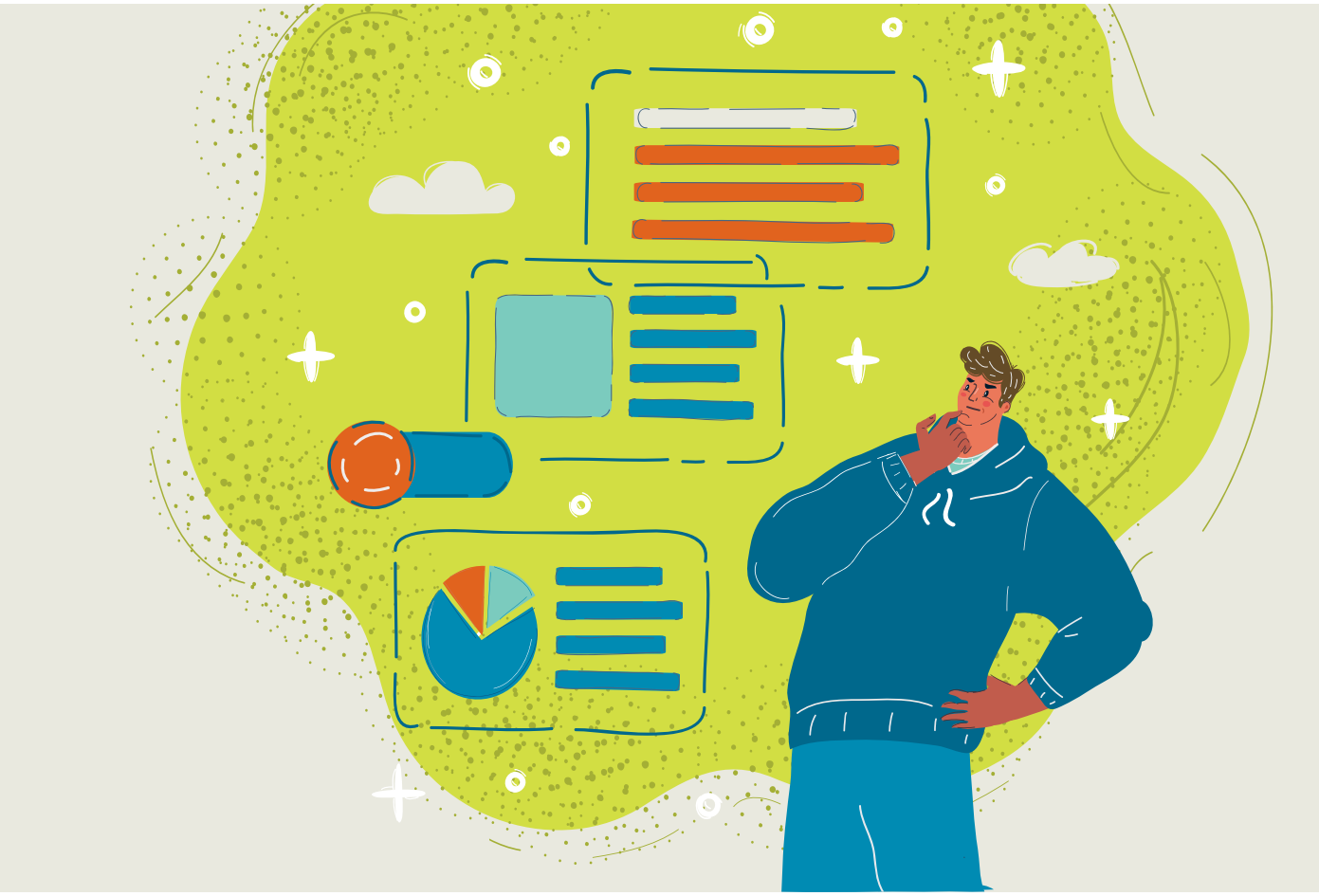
- Consideration of methods for **remote placement of shaped charges in the vent-and-burn** technique
- Using **fibre-optic sensing for the qualification of new materials and new designs** for means of containment

The projects pending from the above list will be reviewed periodically to confirm or re-assess priorities and their continued validity.

These 23 projects were selected from over 120 research ideas gathered following Transport Canada's (TC) TDG Research Symposium held in 2019. The symposium was held to consult with stakeholders on TDG research ideas and to help identify gaps in current TDG research. More information regarding the symposium may be found in an article published in the 2019 Retrospective edition of this TDG Newsletter. All of the research ideas were evaluated, and the 23 highest-ranked ideas were peer-reviewed by external stakeholders. Peer-review feedback was taken into consideration in prioritizing the research projects and developing the plan.

In his opening remarks at the TDG Research Symposium, Benoit Turcotte, Director General, TDG, highlighted TC's on-going commitment to the safe transportation of dangerous goods across all modes, as well as the importance of research in developing evidence-based recommendations to support TDG program initiatives including policy and regulatory development.

The TDG Directorate delivers a wide range of research, including scientific, engineering, risk, GIS and commodity flow, and socio-economic research. Indicative of the importance of research to the TDG program, paragraph 25(a) of the TDG Act authorizes the Minister of Transport to "conduct, alone or in cooperation with any government, agency, body, or person, whether Canadian or not, programs of technical research and investigation into the development and improvement of safety marks, safety requirements, safety standards, and regulations under this Act and coordinate the programs with similar programs undertaken in Canada".



SCIENTIFIC RESEARCH PUBLICATIONS

Author: Nathalie Péloquin

Within the Transportation of Dangerous Goods (TDG) Directorate, the TDG Scientific Research Division has the responsibility to plan, manage and deliver engineering and scientific research, with the objective of informing and contributing to the improvement of public safety during the transportation of dangerous goods. This research is done in accordance with section 25 of the *Transportation of Dangerous Goods Act*, 1992 (TDG Act).

In an effort to disseminate its research to a wider audience, the Division publishes abstracts for completed research projects on the TDG website.

Since the last TDG Newsletter, abstracts for the following reports have been published:

ABSTRACT TITLE	DESCRIPTION
Assessment of the environmental conditions for lithium batteries shipping	Every year, large quantities of lithium-ion cells and batteries (LiB) are shipped around the world by air. If they're damaged, mishandled or have manufacturing defects, they can ignite and start a fire. Several incidents have already occurred when LiBs have been shipped.
Evaluating end of life performance and requalification methods for TC 3CCM cylinders	This report describes a study to measure the strength of expired composite cylinders and look at different test methods for requalifying these cylinders.
Rail tank cars exposed to fire: Analysis of thermal conditions in a railcar engulfed in a crude oil fire (Series 1-3 Tests)	This report describes a study to understand how different crude oils burn and how quickly the oil in a tank car heats up.
Impact of Crude Oil Properties on Flammability Properties	This report details a study that revealed statistical links between various measured properties of crude oil and concluded that flammability measurements can be predicted.

The abstracts listed here, along with other research abstracts in the past five (5) years, are available for reading on the TDG Publications page.

A copy of all published reports can be provided upon request to the Scientific Research Division: TC.TDGScientificResearch-RecherchescientifiqueTMD.TC@tc.gc.ca.