What makes a dangerous goods disaster? The regulatory perspective
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1. Introduction: Can we ever truly have lessons learned?

- While it may be true that the trigger or chain of events leading up to any given industrial disaster is unique, a cursory look at major industrial disasters over the last twenty years in the energy, food, and manufacturing sectors suggests common regulatory failures.

- This points to the possibility that regardless of the technical nature of the activity being regulated, certain patterns of regulatory failure, may nonetheless lead to dangerous consequences with long-term human and environmental impacts.
2. Deregulation by any other name...would be just as dangerous for public safety: The regulatory contexts leading up to the disasters (1)

Canada


- “Regulatory requirements as « silent killers of jobs” - Hon. Dean Allison, House of Commons Debates, 26 January 2015.
2. Deregulation by any other name would be just as dangerous for public safety: The regulatory contexts leading up to the disasters (2)

Japan

- No explicit deregulation policy
- Deregulation benefitting economic interests, at the cost of public health and safety is a well-recognized pattern in the Japanese regulatory environment
- Incremental deregulation has been discretely occurring in Japan on a sector-by-sector basis since the mid-1980s, due to international market opening, and trade liberalization initiatives
- Preference for ex-post compensation for damages, a means of encouraging importers and domestic manufacturers to supply safer goods, rather than ex-ante regulation by Japanese authorities
3. Different events, common regulatory failures: A comparison of regulatory failures involved in the Lac Mégantic and Fukushima Daiichi Disasters

Events at Fukushima Daiichi

- On March 11, 2011, at 2:46 pm, Japan was struck by the largest recorded earthquake worldwide since 1900. The 9.0 magnitude earthquake centred in the Pacific Ocean about 80 kilometres east of the city of Sendai set in motion a powerful tsunami.

- 2 causes of the accident: (1) With the reactor shutdown, the plant was no longer generating electricity, and as such, the cooling systems required an alternative electricity supply. (2) The mechanisms responsible for cooling were destroyed by the flood because they were built at a lower elevation than the reactor buildings.

- Radiological effects are contested, and claims for radiological impacts are still being processed but important human impact due to evacuation of 300,000 residents evacuated from the vicinity of the plant as a safety measure.
3.1 Vague operating rules leaving discretion to operators (1)

- Pattern of vague regulation left the industry to regulate itself, resulting in operators downplaying risks, adopting minimal safety measures regardless of whether they in fact properly mitigated safety risks, or simply failing to adopt safety measures altogether.

- Adoption of objectives-based regulatory model which set performance outcomes without specifying the safety requirements applicable to meet this outcome

- Use of wording like « reasonable », « significantly » leave discretion to operators with regards to the measures they take to counter risks.
3.1 Vague operating rules leaving discretion to operators (2)

Lac-Mégantic

- When equipment is left at any point a sufficient number of hand brakes must be applied to prevent it from moving. Special instructions will indicate the minimum hand brake requirements for all locations where equipment is left. [...]”

Transport Canada, Railway Operating Rules, Rule 12
3.1 Vague operating rules leaving discretion to operators (3)

Fukushima Daiichi

- Until 2006, the *Regulatory Guide for Reviewing Safety Design of Light Water Nuclear Power Reactor Facilities* did not set regulatory standards for tsunami safety. 2006 the issue was only captured by a catch-all clause about [ensuring safety in the event of] “other postulated natural phenomena than [an] earthquake”.

- “Safety features of the facilities shall not be significantly impaired by a tsunami, which should be reasonably postulated to hit – albeit with a very low probability – during the service period of the facilities.” - Revised Regulatory Guide for Reviewing *Seismic Design of Nuclear Power Reactor Facilities*
3.2 Lack of inspections and enforcement (1)

- Patterns of lax inspection and non-enforcement
- Rare or incomplete inspections
- Practice of overlooking breaches of operating rules and regulations
- When violations are found, no regulatory sanctions on the operator for non-compliance or failure to adopt measures to eliminate non-compliance
- Allowing operators to adopt practices known to be dangerous
3.2 Lack of inspections and enforcement (2)

Lac-Mégantic – Lack of inspections

- Transport Canada’s move towards Safety Management Systems involved a shift from a traditional approach to regulatory oversight, where the regulator inspected railway companies’ compliance with operating rules and engineering standards under the Railway Safety Act, to a system in which the regulator focussed on assessing the implementation of effective safety management systems.

- Lack of resources available in the Transport of Dangerous Goods directorate in the face of enormous increases in the transport of oil, led to a troublingly low number of inspections.

- 35 Transport of Dangerous Goods inspectors leading up to the disaster, 16 of which were qualified for railway inspection.

- The number of tank carloads of crude oil per rail safety inspector increased from 14 in 2009 to 4,500 in 2013.
Transport Canada found MMA to be in violation of a large number of safety regulations between 2009 and 2013.

Tank cars filled with crude oil detaching from MMA’s trains and rolling through the town’s main street.

Only three weeks before the disaster at Lac-Mégantic, a badly-maintained MMA track punctured the reservoir of a locomotive, causing its derailment and the dumping of 13 000 litres of diesel in the city of Frontenac, situated only 5 km away from Lac-Mégantic.

Transport Canada took a series of enforcement actions, including issuing letters of non-compliance and letters of concern, ignored by MMA.

TDG inspections resulted in a total number of 22 actions taken to address identified instances of non-compliance, none of which were prosecutions.
3.3 Regulatory capture (1)

- A state of affairs in which regulators tend to identify with the interests of the regulated industry over their obligation to regulate in the public interest, resulting in underestimations of risk and the adoption of unsafe practices by the industry.

- Two main mechanisms allowed for regulatory capture to occur within the regulatory bodies in the cases studied:
  - (a) powerful lobbying and industry involvement in drafting regulations, and
  - (b) a revolving door structure in which experts transitioned from the regulator to the industry and vice-versa.
3.3 Regulatory capture (2)

Powerful lobbies and weak regulators

- Operators are able to influence regulatory decision-making through lobbying or connections within the regulator.
- Influence exerted informally through collaboration with regulator for risk assessments or regulatory reviews.
- Operators essentially writing the regulations.
3.3 Regulatory capture (3)

Powerful lobbies and weak regulators

Lac-Mégantic

■ In the year leading up to the accident, Representatives of the railway lobby, the Railway Association of Canada, met 21 times with about 30 civil servants and members of Parliament.

■ Industry pressure likely at the heart of Transport Canada’s decision to continue allowing the use of DOT-111 tank cars and to lift regulations on Single Person Train Operation (SPTO).
3.3 Regulatory capture (4)
Powerful lobbies and weak regulators

Fukushima Daiichi

- “When an operator proposes the lowest safety standard or the like, the regulatory agency has a tendency to go along with them. [...] This is the way operators stop making efforts to improve safety. I believe we were trapped in a vicious circle.” - Nuclear Safety Commission Chairman Haruki Madarame, 4th NAIIC Commission meeting on February 15, 2012.

- This affected requirements regarding long-term earthquake evaluations and the inclusion of Station Blackouts in safety designs.
3.3 Regulatory capture (5)  
Revolving doors and « descents from heaven »

- Two-way revolving door:
  - The movement of regulators, to industry, attracted by high-ranking lucrative positions, creates a class of regulators concerned with appearing friendly to industry in order to prepare their exit from public office.
  - The movement of industry experts even with the best intentions into regulatory offices imports a culture of profit-driven efficiency, regulation-slashing, and regulatory bargaining.
3.3 Regulatory capture (6)
Revolving doors and « descents from heaven »

Lac-Mégantic

- Almost all of the regulator’s rail safety experts and operations staff were hired from the railway industry.

- Pattern of regulators flowing to high-ranking lucrative industry positions, typically offered as an informal reward for the adoption of an industry-friendly regulatory approach.
3.3 Regulatory capture (7)

Revolving doors and « descents from heaven »

Fukushima Daiichi

- **Amakudari** ("descent from heaven") refers to the well-known practice in which senior regulators are appointed as senior executives in major utilities, while

- **Amaagari** ("ascent to heaven") refers to the practice in which industry experts are employed by NISA’s technical support agency, the Japan Nuclear Energy Safety Organization.
3.3 Regulatory capture (8)

Revolving doors and « descents from heaven »

Fukushima Daiichi

- When Associated Press examined the business and institutional ties of 95 people currently at three main nuclear regulatory bodies, it found that 26 of them have been affiliated either with the industry or with lobby groups that promote nuclear power.

- Practice of “lending” experts to regulators suffering from a dire lack of independent expertise
4. Reforms following the disasters. What has changed?

Lac-Mégantic (1)

- Decision on Single-person train operation (SPTO) reversed

- Transport Canada (TC) issued Emergency Directive that required securing unattended locomotives and established the number of crew members required for operating a locomotive carrying dangerous goods;

- TC Issued Protective Direction No. 31 under the Transportation of Dangerous Goods Act requiring any person who imports or offers for transport crude oil to retest, or classify, their crude oil prior to shipment, and, in the interim, ship it at the highest packing group level (PG1) until testing is completed;

- TC Approved updated *Canadian Rail Operating Rules* that encompass more stringent operational safety requirements for railway companies;
4. Reforms following the disasters. What has changed?

**Lac-Mégantic (2)**

- TC Published proposed regulatory changes in Canada Gazette, Part I, to adopt new standards for DOT-111 tank cars, including thicker steel requirements and top fitting and head shield protection.

- Emergency Directive under the Railway Safety Act establishing a standardized minimum for hand break applications and specific testing requirements, and additional physical defences for unattended trains.

- **Budget 2016: “$143 million over three years …** strengthen oversight and enforcement, and to enhance prevention and response capabilities related to rail safety and the transportation of dangerous goods.” (Came from cuts to other areas of Transport Canada)
4. Reforms following the disasters. What has changed?

Fukushima Daiichi- Reforms (1)

- Creation of a new regulatory body the Nuclear Regulation Authority, independent from Ministries which promote nuclear energy.

- New regulatory body carried out a complete review of safety guidelines and regulatory requirements with the aim of formulating a set of new regulations to protect people and the environment.

- New regulations placing importance on aspects which had been kept out of regulatory requirements through industry pressure:
  - The prevention of simultaneous loss of all safety functions due to common causes;
  - The re-evaluation of assumptions on the impact of external events like earthquakes and Tsunamis;
  - The adoption of counter-measures for nuclear safety against these events were enhanced;
  - It is now required to take countermeasures against fires, flooding and to enhance the reliability of power sources to deal with the possibility of SBO.
4. Reforms following the disasters. What has changed?

Fukushima Daiichi- Reforms (2)

- New regulations will apply to existing power stations, with 5 year deferment period to allow for backfitting

- Inclusion of new requirements regarding inspections to assess compliance with technical standards

- Implementation of a no-return rule which prohibits senior-level regulators from the NRA to assume jobs in ministries promoting nuclear energy after their service as regulators

- Limitations have been placed on regulators seeking employment in for-profit corporations:
  - Forbidding individuals employed by the regulator from job-seeking activity;
  - Forbidding regulators from recommending to industry that they hire government officials
  - Management-level regulators must notify the Cabinet if they are offered re-employment in private industry
4. Reforms following the disasters. What remains the same?

**Lac-Mégantic**

- Removal of most unsafe cars; new safer TC-117 std.; phase-in schedule, by 2025.

- Unsafe tank cars (CPC-1232s) carrying volatile oil until 2025.

- These models continue to puncture and explode (Gogama 2015; Oregon 2016)

- No measures to reduce volatility of the oil

- Still relying on self-regulation through SMS. SMS (without unannounced on-site inspections) equals company self-regulation

- No clear action on regulatory capture especially revolving door phenomenon.

- No work to ensure independence, expertise of regulator independently from industry.
4. Reforms following the disasters. What remains the same?

Fukushima Daiichi

- Still need to adopt concrete measures to prevent cultural capture: could create a separate track through which people can gain the technical training they need to serve the Nuclear Regulatory Agency

- Use of external validators to provide an independent check on industry activities
5. Conclusion: Regulation or safety theatre?

- Evokes Bruce Schneier’s notion of “security theatre”—the practice of investing in countermeasures to security threats intended to provide the feeling of improved security while doing little or nothing to actually achieve it.

- Where regulators are failing to fulfil their most basic duty of oversight, they are engaging in “safety theatre”: convincing the public that regulated activities are safe due to the existence of a regulator, when in fact the regulator is closing its eyes to the very safety risks it is intended to prevent.