Lac-Megantic Train Derailment Disaster

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In the evening of July 15th, a single-person operated 74-car freight train owned by Montreal, Maine and Atlantic Railway (MMA), was parked at the main track near Nantes town. There was smoke leaking from the engine, but the operator and controller decided to solve it the next day, then the operator left. After he left, there was fire observed on the main locomotive, and firefighters came put out the fire and left shortly after. However, as the firefighters switched off the power with the assistance of a track foreman sent by MMA, the air pressure in the air brake dropped and defected. Besides, the rail has a slope with 1.2% grade, the hand brakes alone could not hold the train so it started rolling down towards Lac-Megantic. The train eventually derailed at downtown Lac-Megantic due to it's uncontrolled descent. The tank car filled with crude oil leaked and caused massive explosions, caused 47 casualties and destroyed half of downtown.

According to the investigation report released by Transportation Safety Board of Canada, there are 18 contributing factors. The main issue is the locomotive MMA 5017 was diagnosed with engine defection along with some other problems beforehand, but the repairs did not follow the standard (might due to the cut of cost), which later on caused oil leaked, accumulated and overheated in the turbocharger in the engine, then caught fire. Apart from the failure in the engine, the quantity of hand brakes applied was not sufficient, since the engineer did not carry out the hand brake test right, which was most likely due to the lack of proper trainings. He applied only 7 hand brakes, as MMA standard requires at least 9 hand brakes should be applied. Experts suggest a minimum of 17 hand brakes should be applied under that condition. In addition, Class 111 tank cars that carried crude oil were built under an old standard, which lacked safety enhancement. When the tank cars derailed, the impact power tore up the tank and

caused leaking. Sparks caused by friction of tank car's metal shells ignited leaking oil which led to explosions with a explosion radius of about 1 kilometer. On top of these mechanical misconducts, the safety culture at MMA is considered to be weak, as their safety code was enforced loosely.

Ethics Discussion

There are multiple parties and individuals have ethics liability: The locomotive engineer, Traffic Controller of MMA and Transport Canada.

Although Transport Canada has liability for ineffective supervision, their liability is not strongly associate with the topic, so it will not be discussed here.

To discuss the ethical issues, and also due to limits of information, here assume that MMA staffs who are associated with the accident are all under Professional Engineering Ontario's regulation.

Professional Engineering Act 72.2.a deals with negligence. The engineer did not conduct hand brake test properly, which is a negligence and directly led to the defection of braking system.

Section 72.2.b deals with failure to make reasonable provisions for safeguarding. MMA put locomotive MMA 5017 to use even it was not fully repaired and they knew there was potential risks, but they still ordered MMA 5017 out.

Section 72.2.c deals with failure to correct dangerous situation. At the night that derailment happened, after an abnormal smoke was found, both MMA management and the engineer did not undertake necessary correction. The engineer left and MMA management decided to leave it to next crews to handle it the second day.

Section 72.2.d deals with failure to comply regulations. The investigation shows that although MMA has safety management, but the it was not effectively carried. Plus, the engineer did not follow the standard of hand brake testing, which caused insufficient hand brakes applied and led to defection.

Section 72.f deal with failure to clearly inform the expected consequences to the employer who doesn't have technical backgrounds. In this case, we presume the executives of MMA have technical backgrounds. The engineer at repair shop did not represent clearly what might happen. He might not realize how serious the consequences can be, but then he breached code of ethics 77.1.iv and 77.1.v, as he did not developed competence of undertaking professional works.

Section 77.2.i and 77.2.ii deals with the duty to public welfare. The engineer and MMA's misconduct resulted in irreversible loss to citizens of Lac-Megantic. Especially, MMA's critical budgets cut reveals that they did not put public welfare as paramount, otherwise they would not reduce the spending on enhancing the reliability of their facilities.

The engineer could choose to attend the train until other crews come to handle the locomotive, so that emergencies can be properly handled, or he can choose to park the train in a safe area so that it would not slide down. Besides, he could have conducted the hand brake test properly to decide how many hand brakes to apply. If he's not sure about the procedure, he could contact the controller or other personnel to figure it out. Unfortunately, the safety culture at MMA is weak, and lacked of proper training, so they failed to foresee the consequences and correct wrongdoings.

MMA could react effectively when the locomotive engineer reported that there was unusual smoke leaking from the engine, by sending professional crews to the train to evaluate the situation. If they really could not to do so, they could still send professionals to the site when

firefighters contacted them, instead of sending just a track foreman. The possible reason of them failing to do so might be they were trying to minimize the cost. The most crucial action they should take is enforcing the safety management strictly. For example, train and test their employees properly, regulate single-person operations and come up with detailed emergency pre-arranged plans to handle unexpected situation. The critical budget cut might be the cause for this failure. The reality proved that the cost on safety management is crucial to prevent a company from wrongdoings and guarantee public wellbeing, although it might be in conflict with company's interest. However, as a company who carries professional works, public welfare is the paramount, which has to be prioritized.

As a result, there are 47 criminal negligence charges against the locomotive engineer Thomas Harding, manager Jean Demaitre and the traffic controller Richard Labrie [1], along with some other executives in MMA. They are facing a conviction of "maximum fine of $50,000, and a maximum jail time of six months". I agree with the court's decision. As the locomotive engineer, Mr. Harding should be competent for his performance and properly conduct the hand brake test, give credible advice to the leaking smoke from engine, and be aware of potential risks. As the train operation manager, Mr. Demaitre should strictly enforcing safety regulations, and make necessary amendments to improve the safety management. As the train traffic controller, Mr. Labrie should provide the proper information including the safest location to park the train.

Law Breaches

1) Tort Law

   Regarding the tort law, in this case the defendants are MMA and some of its employees mainly the locomotive engineer, operation manager, and the plaintiffs will be citizens in Lac-Megantic and World Fuel Services (WFS), who shipped the crude oil. Apparently,

MMA has the duty to care Lac-Megantic citizens' safety and properties, while also maintaining the securement of WFS's crude oil shipment. The MMA and its employees' misconducts breached their duty of care and caused serious injuries to plaintiffs. Therefore, the defendants did breach the Tort Law.

2) Contract Law

   There existed contract between MMA and WFS, and MMA breached the contract because they did not ship the oil to the destination successfully, instead, the damaged the oil. Therefore, they are fully responsible for the damages and should compensate WFS.

3) Fundamental breaches

   To determine if there are fundamental breaches, the Tercon test needed to be conducted. To do the Tercon test, exclusion clauses needed to be checked, but it is unclear if there are exclusion clauses in the contract between MMA and WFS, thereby whether MMA has fundamental breaches cannot be identified here.

4) Environmental Law

   MMA clearly breached environmental law as they contaminated the environment of Lac-Megantic. The massive explosions caused heavy smokes and polluted the atmosphere; the oil spills poisoned the land [2]; Chaudiere River was polluted as well due to the oil leak [3]; The contaminants have potential health effects to the residents of Lac-Megantic. Consequently, MMA has to be responsible for the cost of cleaning up the land and river.

In conclusion it's evident that MMA and the train engineering both demonstrate unethical behaviour which was directly effected by the negligent safety culture of MMA, which as a result violated multiple law's in this case environmental, tort and contract law. In addition to these law

violations, the train engineer acted unethically by demonstrating negligence to public welfare including the welfare of the customers to whom the shipment on the train was meant for. If we were to place the train engineer under PEO his violations of ethical code of conduct would result in him losing his ability to practice engineering professionally for the rest of his career. As such this case study is a good example in demonstrating that not showing the proper duty of care and ethical behaviour results in large amounts of devastation to not only the community of Lac-Megantic but to the citizens of Ontario as the province required to payout millions of dollars to clean and repair the damages caused by this accident. In the end, this case study should be seen as a call to action for all engineers to practice ethical behaviour when conducting their job duties.

[1] *"Lac-Mégantic: Charges laid for brake failure in train disaster: 6 people, 2 companies face new charges after 47 deaths in July 2013 derailment and explosion", CBC News, June 22, 2015, retrieved June 22, 2015*
[2] *"5 more victims identified in Lac-Mégantic". CBC Montreal. 2013-07-17. Retrieved 2013-07-19*
[3] *"Leaking oil from Lac-Mégantic disaster affects nearby towns". CBC. July 7, 2013. Retrieved July 7, 2013.*