“Hey, what’s that smell?”

An essay about safety by Thomas Cojocar

It was just another morning in March 2016. I woke up on time, had breakfast, got ready for the day, and left the house. But, as I entered Dr. E.P. Scarlett High School, a foul, putrid odour struck me. It was a characteristic rotten egg smell. It lingered in the nose for a considerable amount of time before dissipating.

My first period class was Biology. It is a relatively long walk to get to the classroom and I already wanted to get out of the building to evade the uncomfortable aroma. While approaching the classroom, I noticed the smell becoming more intense. When I entered the room, I saw my classmates, many of whom were grimacing and talking about the possible sources of the stench. We all wanted to know what had happened. Did a pipe burst in the bathroom? Did a skunk sneak into the school overnight? Did someone from culinary arts class get in over their head? Finally, our teacher entered and told us that a car battery was the source of our misery. Through a series of unlikely events and simple mistakes committed by experienced people, a car battery had been overcharged in the mechanics room.

A car battery works by converting chemical energy into electrical energy. A car uses this energy to start up and keep running reliably. When a battery is overcharged, as what happened in this case, a buildup of hydrogen gas can cause it to swell up like a balloon. As it swells, the seams can rupture, releasing noxious sulphuric acid fumes. Fortunately, the school was empty at the time, and nobody was in immediate danger. However, if students or teachers were in the vicinity of an overcharged car battery, serious safety precautions would have had to be taken. The recommended PPE (personal protective equipment) for handling a car battery includes safety glasses, rubber gloves, a face shield, a chemical apron as well as boots. Since the battery contains sulphuric acid, it can be considered a dangerous chemical agent. If the acid comes in contact with the skin or eyes, it could cause serious acute effects such as chemical burns. When the battery is visibly swollen, it is likely that an excess amount of hydrogen gas is present. This gas can be very combustible and has no smell or colour. Any open flame could cause an explosion.

The incident occurred during the last mechanics class of the day. As the lesson was wrapping up, a student plugged in a car battery to recharge overnight. He/she forgot to tell the teacher that the battery was charging, so nobody

unplugged it. At the same time, the teacher of the class also forgot to turn off the master power switch at the end of class. In addition to this, the battery charger in use was unreliable and faulty, so the safety feature designed to prevent overcharging was not enabled. These three unlikely events allowed the incident to happen. All throughout the night, the battery kept charging until it swelled up to many times its original size. In the morning, the school caretaker was the first to discover what had happened. Presumably, he noticed the smell first, and then discovered the source of it in the mechanics shop. He ventilated the school, and called the school safety officer. The battery was safely removed and classes could resume as planned. As mentioned before, simple mistakes were committed by people who, 99.9% of the time, would perform their tasks perfectly. It is an innate human feature to occasionally make mistakes. Luckily, in this case, nobody was hurt as a result.

The financial impact of the incident was relatively minor. Obviously, a new car battery was bought as well as a new battery charger. The total cost for the new equipment was approximately $400. In addition, nobody was physically hurt as a result. Most importantly, the student learned a valuable lesson about workplace safety. Being due diligent and behaving like a competent worker, as outlined in the glossary of terms on the "Safety in Schools" website, could have helped avoid the unwanted event. While discussing the incident with the mechanics teacher involved, I was told that labelling the battery charger as "faulty" would have prevented the student from using it and could have helped avoid the incident. This is a simple fix that can be implemented quickly to create a more effective safety culture in the workshop. During the discussion, I also realized that properly training students is incredibly important if similar incidents are to be avoided. In the case of this accident however, the teacher was willing to take responsibility as the cause of the incident was mostly human error and even the most experienced people commit blunders. To all but eliminate the chance of the "non-human" side of the accident occurring, all battery chargers should be subject to preventive maintenance. A schedule could be applied that tested regularly to ensure that they are functioning properly. This could be done by students, which would prove as a valuable exercise in preparing them for a job in real work environments. Moreover, it should be made mandatory for a student to inform at least one more person that a car battery has been plugged in. This way, even if one person forgets, another can return to shut off the charger to prevent analogous incidents. Furthermore, engineering controls could be implemented. For example, a designated charging

station could be constructed, which is sealed away from the rest of the workshop. An extensive ventilation system would then be connected to it, and in the event of another battery being overcharged, all dangerous gases could be removed, preventing a respiratory hazard. If a battery was to be overcharged in the enclosed space, a dangerously high concentration of explosive hydrogen gas would accumulate. To prevent an explosion, all combustible and flammable materials would be stored a fair distance from the charging station. All components of the recommended PPE would be kept at close range to allow the execution of an efficient emergency plan. Putting these safety measures in place would almost completely eliminate the possibility of the same incident occurring again.

Still, car battery related injuries are very common. In a one year study by the National Highway Traffic Safety Administration, 134 cases were found that were linked directly to motor vehicle batteries (www-nrd.nhtsa.dot.gov, 1997). The cases were obtained from the National Electronic Injury Surveillance System. In total, 7,051 people were affected in these cases. 32% of those affected were injured by exploding batteries. In most cases, the explosion occurred while the battery was being charged. The majority of victims (62%), received chemical burns as a result of the incidents. In addition, 72% of all victims injured by battery explosions received injuries to the eyes. The second most affected age group was 15-29, placing high school students in a high risk age group.

These types of injuries are easily preventable however. If students are trained from an early age, the proper safety skills will be ingrained in them. With well-structured safety guidelines and highly trained staff, mechanics shops in schools across the world can become safe environments in which students can learn and become competent workers. While I was not personally involved in the incident, I have learned that at some point, everyone is going to make a mistake. Whether it is a student neglecting to turn off a battery charger, or a veteran teacher not turning the master power off. Humans are bound to forget things and it is the collective responsibility of all of us to put in place safety protocols that prevent injury even when a person does forget a part of their routine. Organizations like “Safety in Schools” are already making a huge difference in this area, on a provincial and national level as well. By helping educate students about workplace safety, they are creating a strong workforce that can drive the economy forward. In a more globalized world, competition is becoming increasingly intense. Employers are looking for well-trained workers who do not pose a threat to themselves, their colleagues, or to the company. Having an exceedingly skilled labour force will

most definitely set Canada apart from its competitors and allow a significant portion of the workforce to find employment in their desired industries.

References

Injuries Associated With Hazards Involving

Motor Vehicle Batteries –

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