



INDUSTRIAL VISIT REPORT TO VALE MALAYSIA MINERALS SDN. BHD, LUMUT, PERAK.

Date: October 12th, 2022

Venue: Vale Malaysia Minerals Sdn. Bhd., Perak, Malaysia

Course: MEB2043 Fluid Mechanics I – September 2022 semester

Target audience: Semester 5 students

As a continuation from Coastal and Marine Sustainability Enacted (COME!) Summer School visit to VALE Malaysia Mineral Sdn. Bhd. in August 2022, Erasmus+ MARE team from UTP has arranged a successive event to continue the sectoral collaborative platform between Vale, UTP and Erasmus+ MARE team.

52 students from MEB2043 Fluid Mechanics I subject (Mechanical Engineering Program) along with 1 faculty member (Prof. Ir. Dr. Shaharin Anwar- MARE UTP Project Leader) had visited Vale Malaysia Minerals Sdn. Bhd. for a field-industrial visit.

This visit has also been published and publicized in Vale in Malaysia Facebook and their official website. Kindly click the following links for [Vale post in FB](#) and [website](#).

This industrial visit aimed to

1. Expose students to practical knowledge on applications of fluid mechanics in the industry that is highly committed to sustainability of the environment, particularly the coastal area.
2. Raising awareness about environmental and sustainability interests through company's core values.

Vale is a global mining company, transforming natural resources into prosperity and sustainable development. Headquartered in Brazil and present in about 30 countries. Their operations abroad cover approximately 30 countries that share their mission to transform

natural resources into prosperity and sustainable development. Vale work with logistics, railways, ports, terminals, and infrastructure –, energy, and steel making.

As for the students taking Fluid Mechanics I course, they are exposed to the applications of fluid mechanics in Vale daily operations.

LESSON OUTCOME: FLUID MECHANICS APPLICATION IN DAILY OPERATION

1. Pipe Flows: Vale Lumut maintenance team is responsible for maintaining the plant's piping system by inspections on a regular basis, physical changes (unscheduled repairs), and expansions to a piping system. This demonstrates the importance of:
 - Conditioned fluid pressure to appropriate level (e.g., Vale Firefighting pipes pressure is maintained at 7 bar)
 - Sufficient flow rate is to transport fluid from one location to another. Domestic pipes in Vale Lumut, for example.

2. Hydraulic Systems: The Hydraulic Team at Vale Lumut is in charge of installing, maintaining, and repairing hydraulic systems and responsible for safety equipment for hydraulic, hydraulic cylinder, hydraulic motor, hydraulic power unit, oil cleanliness, emergency breaks (hydraulic part). Fluid mechanics knowledge in the context of hydraulic systems is required for:
 - Less energy consumption and less heat generation.
 - Adaptable during design revision and valuable for production capacity optimization.
 - Greater control over machine settings, reduce waste and error during manufacturing.
 - Adjustable with minimum work mechanism, allow seamless integration of new products into existing manufacturing lines.

3. Lubrication System: In Vale, frequent physical lubrication is the traditional remedy that come with manual lubrication. It is performed on heavy mining equipment using the the pump and reservoir store for a steady flow of lubricant. The manual has adapted to environmental demands.



Figure 1: Representative from Vale Malaysia giving lecture to students on the fluid mechanics application in their industry practice.

4. Oil Analysis: Operators monitor and maximise the life of pipe system and its hydraulic fluid through oil analysis. This includes the knowledge of kinematic and dynamic viscosity. In Vale, basic lubricant properties are measured through laboratory examination. Oil analysis is a part of regular predictive maintenance on the state of lubricant and machines.
5. Vibration Analysis: Three parameters to evaluate which are acceleration, displacement, and velocity. This analysis is important to keep track of a machine as it starts, halts, and runs normally.



Figure 2: Students during the lecture in Vale.

LESSON OUTCOME: ENVIRONMENTAL AND SUSTAINABILITY PRACTICES

In Vale, they are committed in environmental protection through their core values. The students were introduced to Vale's commitment towards environmental and sustainability practices.

1. Filtering polluted water from iron mining before dropping them back to the ocean.
2. Their operations use 100% recycled water.
3. Preservation of wildlife habitat; 60% of the land is announced as protected forest.
4. Keeping clean air quality by monitoring and managing emissions in workplaces and developing carbon-intensive processes.
5. Environmental monitoring management are in place in terms of air quality, environmental audit, noise, water quality and marine ecology.

CONCLUSION

The students are thankful for the department for organizing this informative event as it is important for hands-on experience. We learned on applications used in fluid mechanics and its importance in the environment and sustainability. We thank Vale Malaysia Mineral Sdn. Bhd. for giving us some insights of works in the industry.



Figure 3: Group photo



Figure 4: Vale giving token of appreciation, a book entitled Prize Our Planet Sustaining Biodiversity in Teluk Rubiah to Prof Dr Shaharin.