

Directorate of Outcome
Outcome Report
Event/Activity Organized @AUH

2. Event Name: Seminar/Expert Talk

Aim of Event: Transport Modeling for Assessment of Removal of Toxic Metals from Industrial Sludge

Participation: 70 participants from Department of Civil Engineering & Amity School of Earth & Environmental Science. Amity University Haryana

Date: 24 August, 2018

Venue: Smart Class Room, C-214, ASET, AUH

Organized By: Department of Civil Engineering, ASET, AUH

Faculty Coordinators:

Chair: Prof.(Dr). Priti Singh, Director, Amity School of Engineering & Technology, AUH.

Co-Chair: Prof. (Dr.) R.K. Malik, Prof. & Head, Dept. of Civil Engg., AUH.

Convener : Dr. Naveen B.P., Associate Professor, Dept. of Civil Engg., AUH.

Treasurer: Mr. Lalit Kumar, Assistant Professor, Dept. of Civil Engg., AUH.

Hospitality: Mr. Ankit Batra, Assistant Professor, Dept. of Civil Engg., AUH.

Outcome related to Academia Connect

The environmental issues due to globalization and rapid industrialization are becoming more and more nuisance for human being. Therefore efficient and effective methods are needed especially for chemical industries. Heavy metals present in industrial effluent is major concern of environmental pollution. Heavy metals are generally considered those whose density exceeds 5 g per cubic centimeter. Most of the elements falls into this category are highly water soluble, well-known toxics and carcinogenic agents. Heavy metals are considered to be the following elements: Copper, Silver, Zinc, Cadmium, Gold, Mercury, Lead, Chromium, Iron, Nickel, Tin, Arsenic, Selenium, Molybdenum, Cobalt, Manganese, and Aluminum. They represent serious threats to the human population and the fauna and flora of the receiving water bodies. They can be absorbed and accumulated in human body and caused serious health effects like cancer, organ damage, nervous system damage, and in extreme cases, death. Also it reduces growth and development.

Industrial sludge streams containing heavy metals are produced from different industries. Heavy metals such as cadmium, zinc, lead, chromium, nickel, copper, vanadium, platinum, silver, and titanium are generated in electroplating, electrolysis depositions, conversion coating, and anodizing-cleaning, milling, and etching industries. Significant amount of heavy metals wastes like Tin, lead, and nickel result from printed circuit board manufacturing. Wood processing industries where a chromate copper-arsenate wood treatment produces arsenic containing wastes; inorganic pigment manufacturing producing pigments contain chromium compounds and cadmium sulfide; petroleum refining generates conversion catalysts contaminated with nickel, vanadium, and chromium; and photographic operations producing film with high concentrations of silver and Ferro cyanide.

All of these generators produce a large quantity of sludge that can be categorized as hazardous wastes requiring extensive waste treatment. Because of their high solubility in the aquatic environments, heavy metals can be absorbed by living organisms. Once they enter the food chain, large concentrations of heavy metals may accumulate in the human body. If the metals are ingested beyond the permitted concentration, they can cause serious health disorders. The focus of the seminar addressed the problem by focusing on the

effects of washing the sludge with different leaching solutions, i.e. distilled water, 0.1 N HCl, 0.1 N EDTA, 0.1 N HCl + 0.1 N EDTA and 0.1 N FeCl₃ and to find the appropriate leaching solution to remove the metal ions and also recommending the soil washing technique

Outcome related to Industry Connect

Overall, it was an overwhelming experience where the experts shared their insights and gave new perspectives which can lead to further sustainable action and fruitful interactions.

This seminar includes with a discussion about highly contaminated site (i.e. Bingipura dumpsite & Belandur lake) are generally found in industrial areas which often contain toxic metals such as lead, chromium, cadmium, nickel and zinc. Unlike organic contaminants, most of the heavy metals do not undergo microbial or chemical degradation. The heavy metal contaminated sites cause threats and hazards to humans and the ecosystem by direct contact with contaminated soil; through the food chain (soil-plant-human); by contaminating the ground and surface water resources. Due to its seriousness, the industrial sludge is listed as hazardous waste in India by Ministry of Environment and Forests.

Based upon deliberation of seminar/expert talk, technical sessions, participants presentations, question answer session, several rounds of formal and informal discussions on different aspects of industrial waste, this seminar been able to document few very critical suggestions and able to recommend following points for industrial waste as whole.

1. Environmental Impacts of Industrial Sludge and pollution effects on soil and water bodies.
2. To train the students on analytical and numerical techniques with software tools like MATLAB and POLLUTE model to predict the contaminant transport from Industrial sludge.
3. To provide knowledge and skills to students on remediation of contaminated sites using soil washing techniques

Outcome related to Students Learning & Grooming

The physical, chemical, and biological processes affect the fate and transport of dissolved subsurface contaminants. These processes are then incorporated into a comprehensive model (expressed as a partial differential equation), which may be used to quantify how contaminant concentrations change in space and time. This comprehensive model is used as a tool to examine how individual processes, and combinations of processes, impact the ultimate fate of dissolved subsurface contaminants. These migration rates are useful to design the soil washing program at the site to treat the Industrial sludge.

Outcome related to Society outreach

- The costs associated with the transport of the large volumes of sludge and construction of landfills are very high, and the recycling this waste as a substitute for building materials (like bricks and low cost concrete) is a better option
- The industrial sludge as fertilizer if the pollutants are removed from it to the required level by using washing techniques.

Glimpses of the Event (Photographs)



Fecilitating the guest of honour



Welcome address by HOD, Department of Civil Engineering
Dr.(Prof.) R.K. Malik



Expert Talk Address titled “Transport Modeling for Assessment of Removal of Toxic Metals from Industrial Sludge ” by Prof. (Dr). Sumalatha. J, Ph.D (IISc), Ramaiah Institute of Technology, Bangalore



Momentum handover to the Guest Speaker

Vote of Thanks



Vote of Thanks by Dr Naveen BP

Glimpse



Venue: Smart Class Room C-214