Natech and accidental water pollution – findings of the seminar of the ECE Joint Expert Group on Water and Accidental Pollution

Mr. Bojan Srdić, Co-chair of the Joint Expert Group on Water and Industrial Accidents

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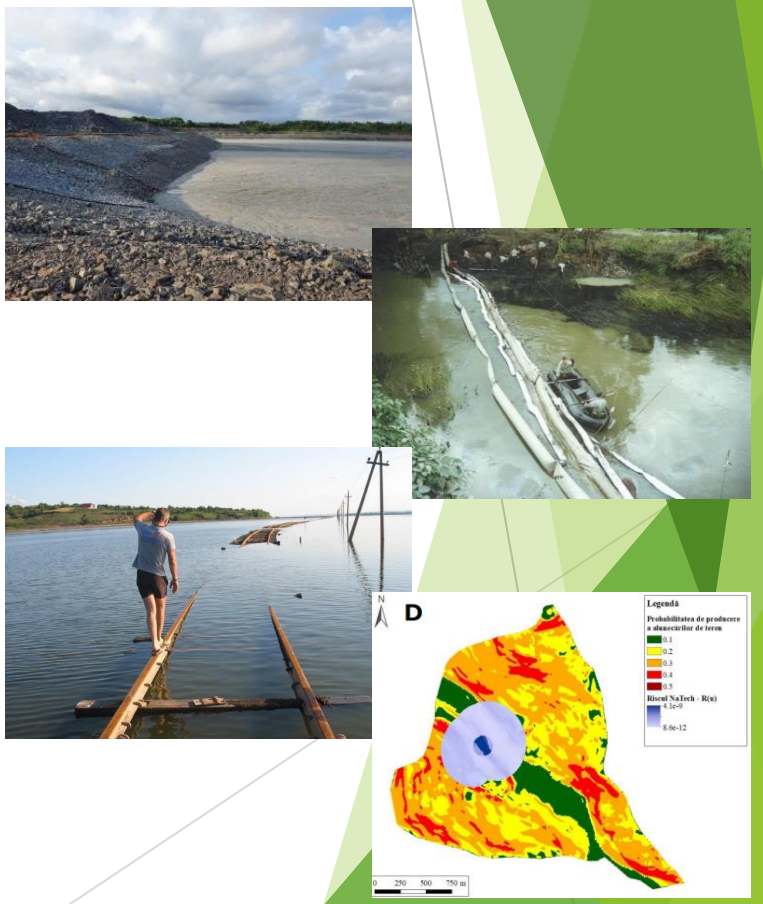
Seminar on emerging risks in accidental water pollution: focus on natural hazard-triggered accidents

- Seminar was organized by Hungary, with the support of Secretariat and financed by Germany
- It was held in Budapest, Hungary and online, 5 October 2022
- The main objective of the seminar was to further strengthen accidental water pollution risk in transboundary river basins
- The seminar aimed to provide a forum to discuss how Natech can be better understood, as well as to identify good practices and innovative approaches
- It covered the following challenges:
  - Challenge 1 – Understanding and preventing accidental water pollution as a result of natural hazards (Natech): lessons learned
  - Challenge 2 – Prevention by design: safe industrial installations in a changing climate
  - Challenge 3 – Innovative approaches to limit the consequences of accidental water pollution events

Challenge 1:
Understanding and preventing accidental water pollution as a result of natural hazards (Natech): lessons learned

1. When addressing the risks of accidental water pollution, critical natural hazards (including their causes and consequences) should be identified, considered, and incorporated into the risk assessment methodologies and legislation stipulating their use, alongside technological hazards and risks. Furthermore, the results should be employed in spatial planning in order to mitigate both accident risks and impacts on the population and the environment.
2. Legislation should lay the foundation for identifying natural hazards and assessing their potential impacts, including cascading industrial accidents, and enable multi-hazard, multi-risk approaches.
3. Considering Natech with respect to accidental water pollution amplifies the need for riparian countries to act jointly on a transboundary level. In this regard, tests with warning and alert systems (e.g., those developed for river basins or the UNECE Industrial Accident Notification System), table-top and field exercises enhance transboundary cooperation.
4. In the response phase following a Natech event, accessibility of roads and transportation infrastructure needs to be provided or promptly restored. Contingency planning, harmonized or joint across borders, to that effect, is important, in line with the provisions of the Industrial Accidents and Water Conventions.
5. In regard to mine tailings safety (and industrial safety more broadly), both competent authorities and operators including mining companies share responsibilities in terms of Natech risk understanding and management. Site inspections are vital and should be completed in sufficient depth.



Challenge 2:
Prevention by design: safe industrial installations in a changing climate

1. Climate change can increase the intensity and frequency of Natech events, and consequently, the likelihood of accidental water pollution. As a consequence, industrial facilities and other critical infrastructure can be damaged, increasing people's vulnerability and the environment's reliance on natural systems (e.g., in the case of polluted drinking water).

2. While historical data and statistics are relevant input to understand Natech events, these statistics are no longer sufficient to understand the nature and frequency of future events, which are likely to outpace past records in terms of their intensity and frequency.

3. An approach for the long-term (sustainable) implementation of existing guidelines and checklists and risk assessment methods is recommended, ideally by integrating or referring to them as reference documents in legislative frameworks that address, among others, preventing accidental water pollution, industrial safety, disaster risk reduction/management, land-use planning, risk assessments, and dissemination to the public. Regular updates of guidelines and methods are essential to address climate change, economic activities and spatial planning.

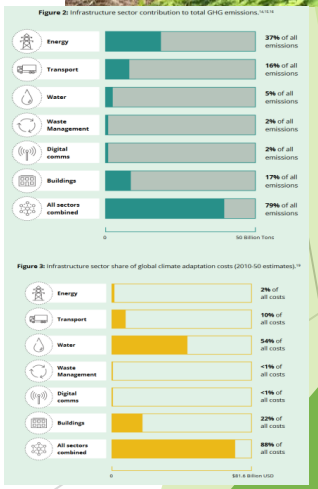
4. An integrated and systemic response to Natech is required. This systemic response could entail multiple elements, such as:

   - Systemic design including vulnerability assessments) and taking into account the ten guiding principles of sustainable infrastructure (including strategic planning, responsive, resilient, and flexible service provision, comprehensive life cycle assessment of sustainability and avoiding environmental impacts of infrastructure systems, among other things)

   - Cooperation between the public and private sectors, e.g., regarding identification of Natech risks, early warning of Natech accidents and mutual assistance coordination in response to Natech accidents.

5. Regional and sectoral climate change adaptation frameworks, as well as inter-sectoral national and transboundary cooperation mechanisms, with the involvement of relevant stakeholder involvement, play an important role in enhancing a country's capacity to prevent and mitigate Natech events and, consequently, accidental water pollution. Sectoral adaptation frameworks include water, energy and agriculture. The impact of climate change on industrial installations among other critical infrastructure, causing potential accidental water pollution, should be addressed in existing and new adaptation frameworks.

6. In order to support and complement regulatory action and existing measures, such as inspection checklists, a technical assessment of critical structural performance of TMFs form an excellent example of how infrastructure resilience can be measured and tested, thus enhancing safety of industrial installations and consequently preventing accidents potentially leading to accidental water pollution. In this regard, the revised ICOLD bulletin provides specific recommendations for assessing dam stability.



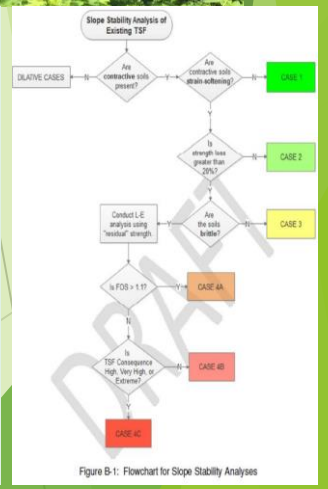
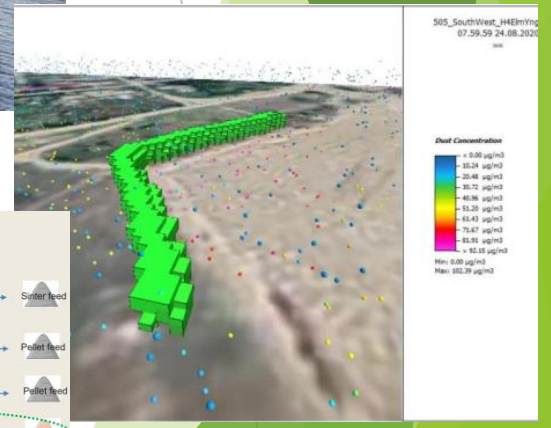
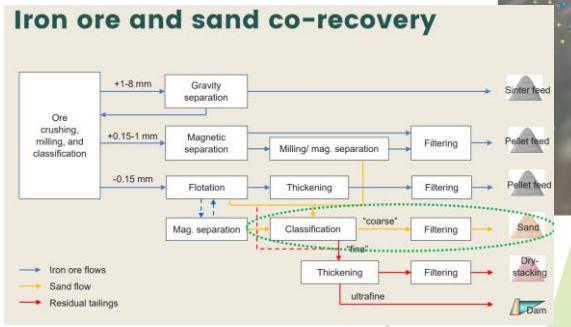


Figure B-1: Flowchart for Slope Stability Analyses

Challenge 3:
Innovative approaches to limit the consequences of accidental water pollution events

1. Warning and Alert Systems (WAS) to cooperate on the transboundary level on the prevention and contingency management of accidental water pollution should be practiced, tested and continuously updated; communication among countries and with transboundary river basin organisations plays a key role in this process. Actual notification as well as exercises need to address prompt notification by/to riparian countries of accidental pollution events as well as near misses. WAS can be subsequently used to request (and render) mutual assistance. Experience with existing WAS can be used to build capacity towards compliance with the United Nations Secretary General's call to ensure every person on Earth is protected by early warning systems within five years.
2. Communication between competent authorities and operators, both on the national and transboundary level, is essential, and effective communication channels should be established. On-site monitoring equipment, linked to WAS, could aid in achieving timely warning, response and notification of authorities.
3. The enforcement of international legal instruments, such as UNECE's Industrial Accidents and Water Conventions, and national instruments, such as laws and permits, is important to mobilize all stakeholders to prevent and respond to accidental pollution events.
4. Nature-based solutions should be considered as a possible approach to mitigating the effects of accidental water pollution, particularly in the long term, by, for example, preventing toxic sediments or limiting pollutants' transport, as well as making industrial installations and other key infrastructure more sustainable.
5. Avoiding and/or reducing the storage of large quantities of waste and limiting the exposure to Natech risks in tailings management facilities could be achieved by redefining the production process produce usable raw materials instead of waste, as such introducing circularity of materials in industrial processes. A good example of this is so-called "ore-sand", a type of processed sand sourced as a co-product or by-product of mineral ores.





General conclusions

1. Legal frameworks should create an enabling environment for integrated risk assessment (with periodical updates), land-use planning and life-cycle design, taking account of all national landmark natural hazards; an approach for the sustainable (long-term) implementation and periodical review of guidance documents and risk assessment methods is necessary.
2. In terms of systemic responses to Natech, an inter-sectoral national and transboundary dialogue, stakeholder engagement and dissemination to local communities increase countries' capacity to prevent and minimize Natech and, consequently, the risk of accidental water pollution; informing competent authorities, in (downstream) countries and operators/companies. Using Warning and Alert Systems is crucial to inform riparian countries, mitigate pollution, in case of industrial accidents and also if pollutions do not meet any standardized definition.
3. In view of climate change, historical statistics alone are insufficient to understand, forecast and adapt to future Natech events. Experience in dealing with past Natech events should be complemented with approaches from circularity and nature-based solutions.

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More information can be found on the [UNECE Web page]

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