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Efficient implementation of mining waste regulations and future tailings-related qualifications

Katarzyna Kreft-Burman, Jouko Saarela, Darron Dixon-Hardy and Jon Engels

Abstract

Tailings dams are usually operated by mining companies or consultancies with experience of tailings facilities, and remain under the supervision of state mining authorities. However, the safety of tailings dams is often not the priority of mining safety legislation and often may not be considered in any great detail. Legislation applicable to tailings management facilities varies in the different EU Member States, and usually includes environmental protection, waste, water and construction legislation. The relatively recent mining-related accidents at Baia Mare, Romania in 2000 and Aznalcóllar, Spain in 1998, and the pollution they caused, have attracted the attention of the public to the environmental and safety hazards of mining activities. As a response to these accidents, the European Commission launched a proposal for a new directive on the management of waste from the extractive industries on 2.6.2003. It is believed that a common set of rules at EU level will establish a level playing field in terms of minimum administrative control and supervision in the extractive industries sector. The purpose of this paper is to present some ideas and suggestions as to how new mining regulations could be implemented and maintained.

Key words: implementation of regulations, legislation on mining waste, tailings dams safety

LEGISLATIVE FRAMEWORK

The stability of hydrological construction, as well as water and soil pollution issues, are already regulated in most EU Member States. However, it has to be stressed that legislation governing the safety of tailings management facilities (TMF) is not consistent between the Member States. In some European countries, there are strong mining traditions with well-developed legislation; in others, water retention dam safety regulations are applied to tailings dams, while other countries lack an effective control system. In general, the variety of

licence requirements, different control systems, coupled with the diversity of the extractive industries (including multi-national companies and SMEs), result in a challenging situation at the EU level. There have been considerable changes in the mining sector throughout Europe over several decades. These changes were caused by economic and political factors, and resulted in the cessation of traditional mining activities in several regions, the introduction of new mining activities in areas with weak mining traditions, as well as in the increased importance of the large international mining corporations. In some cases, there have been opportunities to improve mining waste management systems by applying international experience and high safety standards, but the history of recent major mining accidents in Europe has shown that strong national legislation and efficient control systems are indispensable to avoid or reduce the risk of accidents. The new EU Mining Waste Directive has been drafted in order to set minimum requirements in relation to the management of waste produced by the extractive industries. By spec-

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ifying and improving requirements in relation to the design, operation, closure and aftercare of TMFs, the new directive is intended to ensure the long-term stability of tailings disposal facilities, and to prevent or minimize water and soil pollution (Commission of the European Communities 2003).

THE ROLE OF NATIONAL, REGIONAL AND LOCAL ADMINISTRATION

The adoption of the Mining Waste Directive will impose a demand on national administrators to either create or adapt, and then maintain, regulatory, inspection and enforcement systems, meeting the obligations established by the new Directive. Article 249, paragraph 3 of the EC Treaty states that a Directive shall be binding, as to the result to be achieved, upon each Member State to which it is addressed, but shall leave to the national authorities the choice of form and methods. Thus a Directive leaves the Member States room for manoeuvre and enables them to adopt the most appropriate measures to reach the objectives laid down. This means that certain elements such as, for instance, content or scope of waste management plans and some technical issues remain subjects for further specific deliberation by the relevant national competent authority. Local conditions must be taken into consideration when drafting or adapting national legislation to meet the Directive's requirements (Commission of the European Communities 2003).

In order for the new national regulations to be efficiently implemented, they need to be supported by efforts to develop and publish model plans, policies and technical guidance to which operators and individual officials can refer (Commission of the European Communities 2003).

AVAILABILITY OF INFORMATION

There exists a plethora of international knowledge and experience concerning the safety of mining waste storage facilities, and the role of the authorities would be to utilize this in the form of guidelines and standards. Such guidelines and standards should be available in local languages, as only that can guarantee their full availability to all the operators involved in mining and mining waste storage activities.

The same concerns apply to the best available technology (BAT) document which is expected to provide technical information and increase the clarity of the responsibilities of the operators and supervising authorities. Since the BAT is a bulky document, translation of the whole text might be too time-consuming and possibly unsatisfactory if it covers mining activities that do not occur in a given country. However, at least parts of this document that are the most relevant to a given country should be available in the local language.¹

A website devoted to mining waste issues and tailings dam safety created and administrated by the relevant national authorities might prove to be the best way to disseminate information. It could also enable successful networking and improve the clarity of the system by offering updated information on possible changes.

DAM SAFETY REGULATIONS

Although the standards and procedures in dam safety legislation vary considerably across European countries, they are usually considered to be of a very high standard. However, tailings dams are often regarded as, so to speak, 'lower level dams'. This unfortunately means that laws do not include clear requirements for safety procedures, inspections, etc. for this type of dam. In addition, this lack of clarity in legislation may have effects on the remit of inspections and the requirements of tailings dam safety procedures.

It would benefit the safety of tailings dams if they were included in the scope of the safety regulations in force for water retention dams. Regulations concerning the safety of the tailings dams could either be added to the existing water retention dam safety regulations, or drafted separately using the applicable provisions of dam safety legislation. It is also crucial that dam safety

1. During a training course devoted to tailings and waste dams in Finland held in Kuopio in September 2005, the representatives of the mining industry and consulting agencies expressed their opinion that, since the BAT document is supposed to play such an important role in the management of this stream of waste, it should be available in Finnish. The representatives of the authorities pointed out that the translation of this document would be very time-consuming. It was then suggested that if the necessary resources could be found, parts of this document might be translated.

experts are involved in the supervision and inspection of the tailings impoundments.¹

QUALIFICATION REQUIREMENTS

In the case of new tailings storage it is essential to ensure that the design is based on the highest possible safety standards. This can be achieved only if the design work is performed by adequately qualified persons.²

Also, for the successful implementation of regulations into practice, and therefore for the improvement of the safety of tailings facilities, the required professional qualifications have to be specified. In some countries, the qualification requirements exist in the form of guidelines (Commission of the European Communities 2003). However, it seems that the requirements will be most effective if developed in a separate regulation with requirements for the dam owner and the consulting engineers. It is the role of the authorities to introduce qualification requirements in the form of regulations. An official body responsible for the appointment of specialists should also be established.

In terms of the training and qualifications required, the relevant personnel are the company manager, dam engineer and the staff involved with safety inspection of the dams. It is crucial that the company manager completes some form of education (e.g. a course) that

1. On the international level, in 1989 the ICOLD (International Commission on Large Dams) made an attempt to provide recommendations on the scope of tailings dam legislation. Including, *inter alia*, provisions for commissions, registers, permit procedures for design, construction, operation and maintenance, supervision, authorities, inspections and rehabilitation.

2. Some EU Member States have adopted a system of formal approval for engineers qualified for designing, constructing and supervising dams and reservoirs. In the UK, specialists in dam construction are appointed to panels of qualified civil engineers for a five-year period by the Secretary of State for the Environment. The four panels are: (1) all reservoirs; (2) non-impounding reservoirs; (3) service reservoirs; and (4) supervising engineers. Outside the EU, Norway has strict requirements for engineers responsible for the planning and reassessment of dams. There are two approval classes: overall safety (project manager) and dam specialist. The approval class for the dam specialist is subdivided in four main areas: (1) concrete dams; (2) embankment dams; (3) gated spillways and diversion works; (4) flood calculations. For high-hazard dams, the consulting engineers are required to hold a masters' degree in engineering and at least eight years' experience in each of the approval areas.

concentrates on legal aspects of dam safety, emergency action planning and dam safety awareness.

POTENTIAL QUALIFICATIONS FOR TAILINGS PERSONNEL

The introduction of qualification requirements for engineers involved in design, construction, consulting and safety inspections should be simultaneous with the creation of an education system for such specialists. Specialists dealing with tailings dams need not only appropriate education but also a sufficient degree of interdisciplinary knowledge and experience (Commission of the European Communities 2003). In some countries there is a lack or a shortage of personnel fulfilling such requirements. The ageing of professional staff is one of the reasons for this situation, and is often the result of temporary recessions in different branches of the mining industry. For instance, in Finland, there are several new mining sites, but when some of the specialists retire in the near future, there could be an acute lack of the experienced staff needed to ensure the safety of construction and management of the tailings facilities.

The educational opportunities for the tailings dams specialists might be organized at the international level under the auspices of the EU and lead to professional certification. This would enable an efficient dissemination of know-how and experience from different countries and create an international network of experts who could utilize their new skills and experience on the national level.

A similar educational system and networking possibilities should be created for the members of the national and local authorities involved in the licensing process for the TMFs, and in their inspection. This can be performed at the national level, but some form of international education and cooperation between authorities would be in line with the Article 15 of the Directive on exchange of information among neighbouring countries on waste facilities that could have negative consequences on their environment (Commission of the European Communities 2003).

TRAINING OF THE OPERATING STAFF

Tailings dams are constructed on a continual basis and

are thus distinct from water retention dams. They require specific levels of management at all stages of design, construction and maintenance. It may be said that tailings dams are much more 'alive' on a daily operational basis than water reservoirs. For this reason, the importance of training for operating staff who are involved in ongoing construction long after the dam has been designed should also be stressed very strongly (Grigg and Lyell 2006).

RAISING DAM SAFETY AWARENESS

In most cases, tailings dams are operated by mining companies or consultancies, and supervised by State Mining Authorities. Tailings dam safety might be considered a minor issue in comparison to, say, mine production and worker safety. Many involved in the design, operation and maintenance of tailings dams may not fully realize their legal responsibilities. Therefore, it is the role of the authorities to demand a high level of knowledge and dam safety awareness from the managers and the operators of the TMFs. A company should demonstrate sufficient internal knowledge, and awareness should be raised among all personnel involved in the operation and maintenance of the TMFs. A high level of dam safety awareness is crucial for maintaining sound professional standards.

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Website: <http://www.tailSAFE.com/>

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