

About the course

Internal erosion, alongside overtopping, is one of the most hazardous issues that can affect the safety of embankment dams.

Internal erosion in soils involves very complex hydro-mechanical phenomena, whereby a large number of factors (some of them as yet unknown in all probability) play an important role. It is thus natural that the research so far on internal erosion is predominantly of an empirical nature and experimentally based.

Over the last decades there has been a growing interest at finding ways to estimate the probability of failure by internal erosion, as a part of risk assessment for dam safety. To this end, the internal erosion process leading to dam failure is usually broken in smaller events. These are more easily understood and simpler to estimate probabilities.

This one-day course aims at improving the knowledge and understanding by the participants about the process of internal erosion in embankment dams, in a dam safety context.

The emphasis is placed on the phenomenological and experimental standpoint. The main factors influencing each step of the internal erosion process are presented. The most relevant laboratory tests/empirical studies for the study of the likelihood of occurrence of the various phenomena involved are also indicated.

Filters are the first line of defence against internal erosion. Thus, some best practices concerning the design and construction of filters are indicated.

Who should attend?

- Dam owner engineers, designers, consultants, contractors and regulators dealing with risks associated with internal erosion phenomena in embankment dams and their foundations during first filling or operation phases,
- PhD/MSc students and graduated students with ongoing studies in topics related with internal erosion in soils.

Speakers

Emanuel Maranha das Neves • IST • Portugal

Laura Caldeira • LNEC • Portugal

Ricardo Correia dos Santos • LNEC • Portugal

Alexius Vogel • Risk Assessment Int. • Austria

Important Notes

- The number of participants is limited to **30**.
- If you are interested in attending this course you can send an email to damworld@lnec.pt or register on http://dw2015.lnec.pt/registration_form.html,
- The organisation may decide to cancel the course if a minimum number of participants is not achieved.

Registration Fee

One-day Course • 250 Euros

Participants will receive a comprehensive set of notes, articles and documentation. Lunch and refreshments are included in the registration fee.

Payment

Bank Transfer

Account holder: FUNDIC
NIB: 0018 0365 002000 10582 22
IBAN: PT 50 0018 0365 002000 10582 22
SWIFT code: TOTAPTPL
Santander Totta - Bank
Largo Frei Heitor Pinto 7-A/B
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Please send proof of payment to fundic@lnec.pt with the participant name.

Credit Card


PayPal
at <http://dw2015.lnec.pt/registration.html>



Second International
Dam World Conference

PORTUGAL • LISBON • LNEC
April 21-24, 2015



One-day course

Internal erosion in embankment dams and foundations

Phenomenological and
experimental standpoint

20th April 2015
LNEC • Lisbon • Portugal



One-Day course

Failure of embankment dam

Mesericordia Dam • Alentejo • Portugal



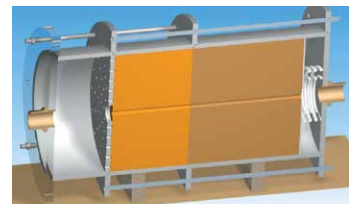
Downstream view



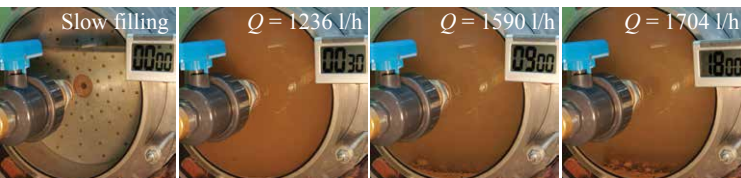
Outlet conduit



Example of laboratory test for evaluation of the progression of internal erosion in embankments



FLET
Flow Limiting Erosion Test



Preliminary Programme

9:00 - 9:10 **Welcome remarks**

9:10 - 10:30 **Session 1** (E. Maranhã das Neves)
Structural problems triggering the internal erosion process

Basic terminology Concepts
Initiation Continuation Progression
Detection/intervention Repair Breach

10:30 - 10:45 **Coffee break**

10:45 - 12:30 **Session 2** (R. Correia dos Santos)
Laboratory tests for the evaluation of soil erosion in dams

Dispersion Erodibility
Suffusion Backward erosion
Contact erosion Filters performance
Flow limitation by upstream fill
Crack-filling action by granular soil

12:30 - 14:00 **Lunch**

14:00 - 16:00 **Session 3** (L. Caldeira)
Filters design/construction for control of internal erosion continuation

Types/functions Current design criteria
Conceptual filter erosion boundaries
Best construction practices

16:00 - 16:15 **Coffee break**

16:15 - 18:00 **Session 4** (A. Vogel)
Databases of dam failures by internal erosion and lessons to learn from it

Dam failure cases dam failure databases
Lessons to learn from dam failures

One-day course on
Internal erosion in embankment dams
Phenomenological and experimental standpoint
20th April 2015

Venue

The one-day course will take place at
LNEC • National Laboratory for Civil Engineering
Lisbon • Portugal



In association with



Second International
Dam World Conference



Conference Chair

Carlos Pina, Portugal

Organising Committee

Eliane Portela, Portugal • Laura Caldeira, Portugal
António Lopes Batista, Portugal • José Marques, Brazil
Ivo Dias, Portugal • Ricardo Correia dos Santos, Portugal

Contacts

LNEC > Assistance office to organisation of meetings
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