



ABOUT THE HYDRAULICS AND ENVIRONMENT DEPARTMENT OF LNEC

FOCUS: DAMS

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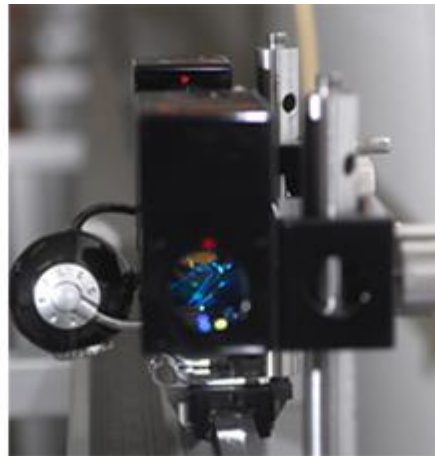
Head of Department

February 2018



LNEC: Mission

- To undertake, coordinate and promote scientific research and technological development
- Continuous improvement and good practice in Civil Engineering
- Public interest, services of Sc & Tech to public and private, national and foreign entities



LNEC Campus (22 ha)



LNEC: 8 Department Units

- Concrete Dams Department
- Buildings Department
- Structures Department
- Geotechnics Department
- **Hydraulics and Environment Department**
- Materials Department
- Transportation Department
- Scientific Instrumentation Centre

The Hydraulics and Environment Department (DHA)



- Develops research in the whole water cycle, focused on 5 strategic lines:
 - ✓ Risk management and safety
 - ✓ Hydraulic infrastructures
 - ✓ Environment and aquatic systems
 - ✓ Urban Water
 - ✓ Information technologies applied to water and the environment

- DHA activity within the water cycle focuses on:
 - ✓ Natural water cycle – in land, transitional and coastal waters
 - ✓ Urban water cycle
 - ✓ Water quantity and quality, including the ecological quality
 - ✓ Relation between water and structures related to water uses by human activities



LNEC & DHA in the World



Research projects and consultancies in more than 50 countries

Visit the Web page:

<http://www.lnec.pt/hidraulica-ambiente/en/introduction/>

The screenshot displays the website for the Hydraulics and Environment Department at LNEC. The header includes the LNEC logo and the text "LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL". A search icon and a language selector (EN) are visible in the top right. The main navigation menu includes "INTRODUCTION", "COORDINATION", "R&D&I", "UNITS", and "CONTACTS". The "UNITS" menu is expanded, showing a list of units: "Urban Water Unit", "Estuaries and Coastal Zone Unit", "Ports and Maritime Structures Unit", and "Water Resources and Hydraulic Structures Unit". The main content area features an "INTRODUCTION" section with a paragraph describing the department's mission. Below the text is a collage of images, including a map, a data table, and a line graph.

LNEC LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL

EN

LNEC > Departamento de Hidráulica e Ambiente > Introduction

MENU

HYDRAULICS AND ENVIRONMENT DEPARTMENT

Search on department

INTRODUCTION

COORDINATION >

R&D&I

UNITS >

CONTACTS

Units

INTRODUCTION

DHA's mission is to address, in an integrated way, the societal challenges for surface waters (urban, riverine, estuarine and costal) and groundwater, as well as infrastructures (urban riverine and port). This is achieved through the development and application of state-of-the art methodologies and tools.

Urban Water Unit

Estuaries and Coastal Zone Unit

Ports and Maritime Structures Unit

Water Resources and Hydraulic Structures Unit

Dams – LNEC's activity

- New works
- Rehabilitation / expansion of existing works
- Risk assessment

- From the structural view point (concrete and embankment dams)
- From the hydraulic viewpoint

- Numerical and physical modelling; in situ monitoring and assessment

Experimental facilities

- 5000 m² of experimental pavillions
- Pumping capacity up to 2500 l/s

Aquifero artificial para ensaios de infiltração e de lixiviação de poluentes em águas subterrâneas

Canal para estudos de correntes de turbidez

Canal para estudos de jatos

Instalação descarregadores não convencionais

Instalação para estudos de rotura de barragens

Canal para estudo de bacias de dissipação

Canal de escadas de peixes

Canal de inclinação variável de 40 m de comprimento

Canal para estudos de descarregadores em degraus

2 Laboratórios
LASUB (ensaios de lixiviação e monitorização de águas subterrâneas)
LAMEX (águas superficiais e EH)

Canal para estudos de cheias e inundações em rios

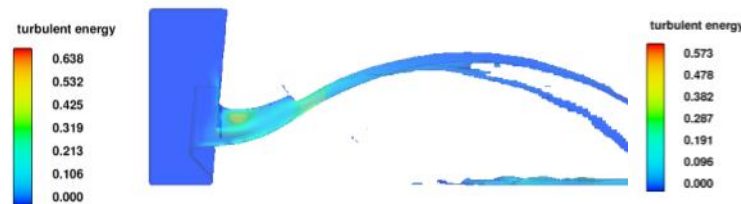
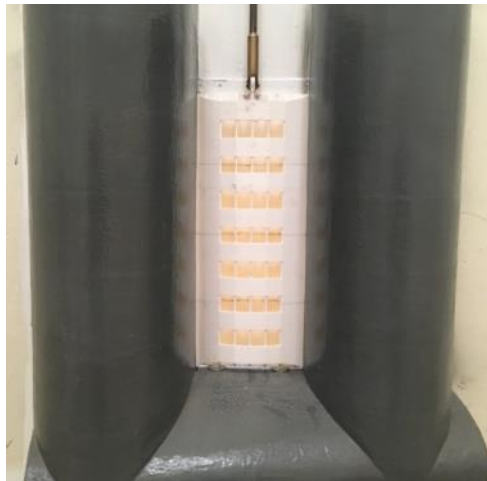
Hydraulic model study of gate operation

Case study – 45 year old high head dam with deep orifice outlet (Africa)

Scope – Risk of regulating gate blockage in any opening position

Objectives:

- Simulate emergency closure of stop log under the full head and cutting flow
- Characterize hydraulic behavior between the stop log and the regulating gate
- Guidelines for stop log safe operation



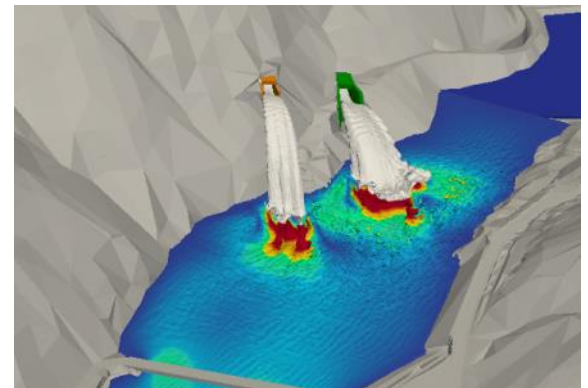
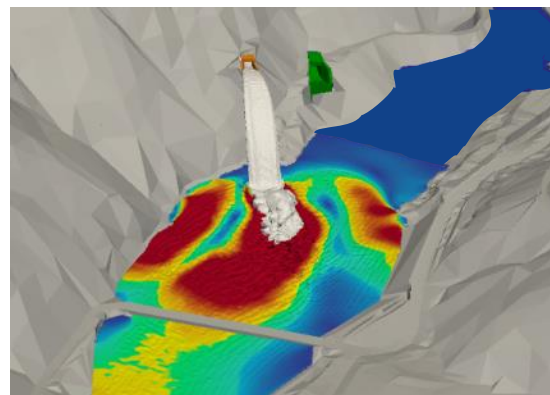
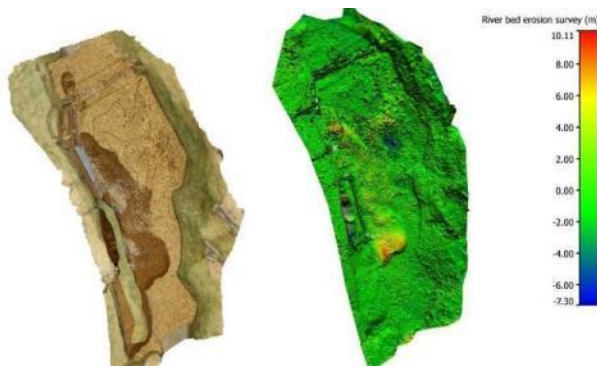
Existing spillway operation assessment

Case study – 40 year old high head rockfill dam with tunnel spillway (Albania)

Scope – River bed scour and bank slopes instability problems

Objectives:

- Simulate the spillway jets and plunge pool with 3D numerical and scale models
- Characterize river bed scour and bank slopes erosion processes
- Recommend remedial measures



From design to long term planning

- Need for a good asset management process
- At LNEC:
 - R&I on structures and hydraulics
 - R&I on asset management (starting with urban water systems)
 - National initiatives on infrastructure asset management
 - AM is currently a strategic scientific area
- EX: EDIA

Thank you for your attention

