# **Water Power**

#### www.waterpowermagazine.com

Volume 69, No. 11, November 2017

#### EDITORIAL

Editor Carrieann Stocks Tel: +44 (0) 20 8269 7777 carrieann.stocks@compelo.com Tweet: @waterpowermag

Contributing Editors Suzanne Pritchard, Patrick Reynolds

Editorial Assistant Tracey Honney

#### ADVERTISING SALES

Diane Tite - Sales Manager Tel: +44 (0) 20 8269 7854 Diane.tite@compelo.com

Glen Savage - Sales Manager, Power Group

#### PRODUCTION AND DESIGN

Production Controller Dave Stanford Classified Production Controller Sarah Lovesy Graphic Designer Karen Bishop



United Kingdom: Global Trade Media, Progressive House, 2 Maidstone Road, Foots Cray, Sidcup, Kent DA14 5HZ, UK. Tel: +44 20 8269 7700, Fax: +44 20 8269 7804, Email: carrieannstocks@globaltrademedia.com

Italy: Ediconsult Internazionale, Piazza Fontane Marose 3, 16123 GENOVA, Italy Tel: +39 010 583 684, Fax: +39 010 566 578

Japan: Masayuki Harihara, Yukari Media Inc., 3-4 Uchihiranomachi, 3 Chome chuo-ku, Osaka 540-0037.

Japan: Tel: +81 6 4790 2222, Fax: +81 6 4793 0800. Email: ymi4886@cello.ocn.ne.jp

Subscription Office: For subscription enquiries, single copies or back issues: Progressive Intelligence, Customer Subscriptions Department, 2 Maidstone Road, 2nd Floor, Sidcup, DA14 5HZ Tel: +44 845 155 1845, Fax: +44 20 8269 7877

Email:cs@progressiveintelligence.com

#### North America only

International Water Power & Dam Construction (ISSN 0306-400X) is published monthly by Global Trade Media, Progressive House, 2 Maidstone Road, Foots Cray, Sidcup DA14 5HZ, UK. The US annual subscription price is US\$605.99. Airfreight and mailing in the USA by agent named Worldnet Shipping Inc., 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA. Periodicals postage paid at Jamaica NY 11431.

US Postmaster: Send address changes to International Water Power & Dam Construction, Worldnet Shipping Inc. 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA

Subscription Rates 1 YEAR SINGLE COPY UK£309.99 UK£32.99 USA/Canada airspeed US\$635.99 US\$67.99 Europe, inc EU, airspeed €481.99 €50.99 Rest of world airspeed US\$641.99 US\$67.99 Digital edition only: £216.99, €325.99, \$433.99

Published by Global Trade Media, a trading division of Progressive Trade Media Limited, Registered addre sive House, 2 Maidstone Road, Foots Cray, Sidcup, Kent DA14 5HZ, UK.

© 2016 Global Trade Media, a trading division of Progressive Trade Media Limited

Printed by Stephens & George Print Group.
The paper used in this magazine is obtained from manufacturers who operate within internationally recognised standards. The paper is mad from Elementary Chlorine Free (ECF) pulp, which is sourced from sustainable, properly managed forestation.

MEMBER OF THE AUDIT BUREAU OF CIRCULATION

## ÚSTŘEDNÍ KNIHOVNY ČVUT



#### News

**World News** 

## Spotlight

#### 10 Small Hydro Latin America

What to expect from this years event, to be held from the 5-6 December in Colombia.

#### **Uprating & refurtishment**

#### 12 Boone Dam remediation

A major remediation project is well underway at the dam in Tennessee, US. following the discovery of a sinkhole at the project.

#### 14 On the up

Roundup of refurbishment projects at hydropower and dam facilities worldwide.

#### Inspection

#### 18 The modern dam engineer

We asked members of the industry for their own thoughts about the role of the modern dam engineer: Has this changed in recent years? Are engineers faced with increased challenges? And will this role continue to evolve?

## **Pumped storage**

#### 28 Feasibility investigations

Snowy Hydro is investigating the feasibility of expanding pumped storage capability at its Snowy Mountains hydroelectric scheme.

#### 32 Developments in pumped storage

Recent pumped storage developments from across the globe.

### Planning

#### 36 Flood resilient

Cities worldwide explore and invest in integrated flood resiliency in face of climate change.

#### 40 Fighting floods: lessons learned from Asia Pacific

Discussing stormwater management and how investment in this is increasing across Asia.

#### Modelling software

## 43 Modelling tools

Technologies have been developed to allow engineers to explore their design options and monitor existing projects.

#### **Training**

#### 44 Exploring the future of robotics

Are more female students showing an interest in underwater robotics?

#### 45 Investing in education

Royal HaskoningDHV's Saturday Schools in South Africa are celebrating their 10 year anniversary.

Cover: Innovative labyrinth weir at Penwhim Reservoir in Scotland -Courtesy of Black & Veatch (see p18).