

NEWSLETTER no. 1/2018



IAPS Message



ICPS5 in Poznan - summary



Project SHIELD



Innovative blast barriers

IAPS Message: President of IAPS

It is my great pleasure to write this short message in the inaugural issue of the IAPS Newsletter. With the great effort of our executive committee, led by IAPS Deputy President, Dr. Piotr Sielicki of Poznan University of Technology, Poland, we are able to publish this Newsletter and distribute it to IAPS members and interested people worldwide. This is the first issue of IAPS Newsletter. More issues will be published and hopefully at a regular basis.

I am deeply honoured to serve IAPS as its second president, taking over the leadership role from the foundation president, Prof. Norbert Gebbeken, after the election in August 2018 at Poznan in the IAPS General Assembly held during the fifth International Conference of Protective Structures (ICPS). I would like to take this opportunity to thank all the IAPS members for your trust and will do my best to serve IAPS.

I would especially thank Prof. Nobutaka Ishikawa of Japan Defence Academy and Mr. John Crawford of Karagozian & Case, Inc. USA, both chose to retire from the IAPS Board after serving the board for many years. Both of them contributed enormously to the development of IAPS, through actively participating in almost all the previous ICPS, contributing to the first IAPS Open Forum and other activities, as well as publishing a number of papers and reviewing many submissions to IAPS journal, International Journal of Protective Structures (IJPS). I know both of them still remain active professionally and look forward to meeting them in conferences and other events.

I would also like to take this opportunity to briefly recall the history of establishment and development of IAPS. IAPS was officially launched on 1 Oct at Manchester, UK during the first ICPS, with Prof. Norbert Gebbeken as the foundation president, Prof. David Yankelevsky and I as the two deputy presidents. The 1st ICPS was a combination of the scheduled 3rd International Conference on Analysis and Design of Structures against Explosion and Impact (ADSEI) and the second International Workshop on Structures Response to Impact and Blast (IWSRIB). The 1st ADSEI was held in Tianjin, China, co-chaired by Prof. Zhong-Xian Li and I in Sept 2006. Many prominent researchers in Protective Structures, including John Crawford, Nobutaka Ishikawa, Qingming Li, Qin Fang, Norbert Gebbeken, and Mark Stewart attended the conference. With the supports from Prof. Norman Jones and Qingming Li, editor and associate editor of International Journal of Impact Engineering (IJIE), a special issue of selected papers presented in 1st ADSEI was published in IJIE. The 2nd ADSEI was held in Oct 2008 in Beijing, China. During the conference, discussions were initiated for establishing a new International Journal of Protective Structures (IJPS) to accommodate the increased number of research papers and to devote to publishing high quality papers related to protection of structures against extreme dynamic loads. Delegated by a number of people in the 2nd ADSEI, I started to approach publishers in late 2008 and prominent researchers to form the editorial board. The publishing agreement was signed with Multi-Science Publishing Company in June 2009 to start publishing IJPS in 2010. Prof. David Yankelevsky and I decided to organize an event to announce IJPS, and to attract papers. With this in mind the 1st IWSRIB was announced on 25 June 2009, and successfully held in Technion, Israel in November 2009. During the 1st IWSRIB, many delegates recognized the necessity of forming an International Association of Protective Structures as a platform to bring academics, researchers and practising engineers together for better infrastructure protections against man-made and natural explosion and impact. Three weeks later in December 2009 in the International Conference on Shock and Impact Loads on Structures at Adelaide, Australia, it was decided to form IAPS

and start a conference series with it. The ICPS was developed by combining ADESEI and IWSRIB. Prof. Qingming Li of the University of Manchester chaired the 1st ICPS, with Zhong-Xian Li, David Yankelevsky and I as co-chairs. IAPS was officially announced on 1 Oct at Manchester, UK, during the 1st ICPS.

Since 2010, IAPS has been growing steadily, with about 400 members worldwide now, as well as its associated conference ICPS and Journal IJPS. Six countries, namely Australia, Czech Republic, Israel, Malaysia, Poland and UK have established National Chapters of IAPS. Four more ICPS have been successfully held in Potsdam, Germany (together with ISIEMS), Newcastle, Australia, Beijing, China, and Poznan, Poland. The IJPS has published about 250 papers (four issues per year since 2010), and received 1547 citations in Scopus.

The new board and executive committee of IAPS, resuming the duty in August 2018, will work together to bring further development and success to IAPS in the coming four years before its next election.

Wishing you all a Successful 2019!

*Hong Hao
IAPS President
Department of Civil Engineering
Curtin University*

December Issue of International Journal of Protective Structures

Local variations in gabion structures

Sam Clarke, Andrew Barr, Jim Warren and Angus Williams

Blast mitigation effect of the layered concrete structure with an air gap: A numerical approach

Xiao Yu, Li Chen, Qin Fang, Xiaofeng Hou and Yi Fan

Ballistic performance study on the finite steel target subjected to normal and oblique impact by copper explosively formed projectile

Jianfeng Liu, Yuan Long and Chong Ji

Numerical analysis of collision between a tractor-trailer and bridge pier

Luwei Chen, Hao Wu, Qin Fang and Tao Zhang

Experimentally validated predictive finite element modelling of the V0-V100 probabilistic penetration response of a Kevlar fabric against a spherical projectile

Gaurav Nilakantan

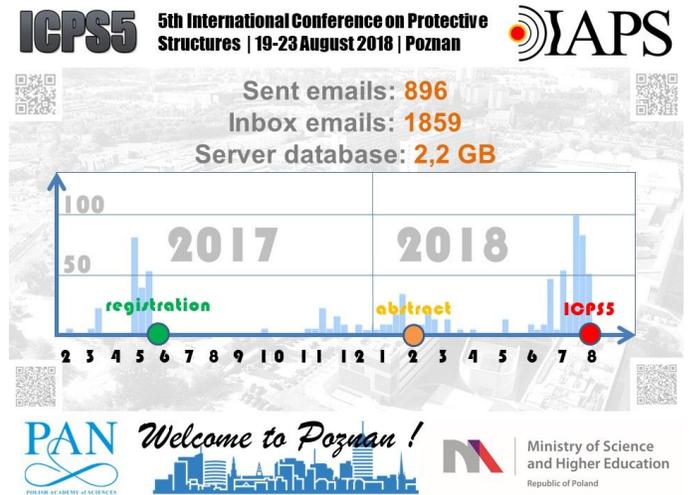
Predictions of residual carrying-capacities for fire and near-field blast-damaged reactive powder concrete-filled steel tube columns

Wanxiang Chen, Zixin Zhou, Huihui Zou and Zhikun Guo

IAPS Message: ICPS 5 in Poznan



ICPS5 Group photo



Intensity of emails sent per week (01.2017-08.2018)

It's been a wonderful time with your support, finishing on the successful year 2018 and ICPS5 event in Poznan. Thank you very much for attending the conference and your activity in the field of protective structures engineering. It is credibly important to meet each other during such events, change ideas and experience and promote outstanding outcomes. The final number of the ICPS5 participants was 138, including 111 presentations and 6 invited keynotes. Moreover, right before the ICPS5, we organized the two-day short course: "Blast effect analysis and design". I was jointly offered by Karagozian & Case, Inc., USA, and Poznan University of Technology, Poland. Next years we are going to start a new edition of such meeting, however, including a real range field experiments supported by the analytical solution. In summarize, I'm glad to inform that in the next two years we'll move to the USA, Auburn University and be active during ICPS6.



Please follow the IAPS webpage and social channel on Facebook for details.

Piotr W. Sielicki
IAPS Vice President
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Project SHIELD



International Cooperation:

Super Heavy Improvised Explosive Loading Demonstration (SHIELD) and Cloudberry

Vehicle-borne improvised explosive devices (VBIEDs) continue to be a threat worldwide; therefore, Germany, Norway, Sweden, Switzerland, and the United States are collaborating on a series of experiments to evaluate the performance of various protective structures subjected to the effects of VBIEDs. The overall aim is to contribute to a safer environment for both civilian and military interests. The first six experiments of the series, named Cloudberry, occurred in Sweden in September. The tests resulted in invaluable information on structural response and damage due to blast loading. The next experiment of the series, named SHIELD, is planned for Summer 2019 and will also occur in Sweden. SHIELD will investigate the effects of a very large, realistic VBIED on protective structures such as guard towers, perimeter walls, civil defence shelters, protected troop accommodation, and fighting positions. Additionally, the VBIED effects on buildings with various facades will be investigated. The results from SHIELD will allow the partner nations to gain the know-how to protect Soldiers and civilians in the future.



Experiment from September 2018 Cloudberry in Sweden. Photo credit: WTD52

*Catherine S. Stephens
U.S. Army Engineer Research and Development Center
Geotechnical and Structures Laboratory*

Research on innovative blast barriers

The research group of Professor Norbert Gebbeken at the Bundeswehr University in Munich (UniBw Munich) performed field tests to study/examine the potential of innovative protective structures. The results show that light and flexible structures such as metal ring meshes in combination with water and even plants can effectively reduce the overpressure caused by explosions. The test campaign was conducted in September 2018 at the proving ground of the German Federal Institute for Materials Research, and Testing (BAM) near Berlin and was funded by the German Federal Office of Civil Protection and Disaster Assistance (BBK).



Four different plants (bamboo, barberry, thuja and yew tree) and a metal ring mesh with and without an added water curtain have been tested successfully. The examined scenario was the detonation of a 5 kg TNT-equivalent charge in a distance of 5 m to the test subjects. The overpressure histories were recorded in front of the test subjects and at two positions behind them. Pressure gauges with the same distances to the charge recording overpressure histories in case of an unimpeded blast wave propagation delivered reference values.

The results show that the metal ring mesh (similar to a chain armour) reduces the peak overpressure by around 20 %. In combination with a water curtain (water flowing through the vertically stretched mesh), an overpressure reduction of nearly 60 % was achieved. The plants, especially yew tree and thuja, effectively reduced the peak overpressure by approximately 45% and 39% respectively. In comparison to bamboo and barberry, that both caused reductions of less than 30%, yew tree and thuja additionally suffered almost no damage by the blast loads.

The results prove the protective potential of these architectural appealing blast barriers and should encourage further research. Such elements offer new possibilities for city planners, architects and engineers as they can be integrated into protection concepts for buildings or public places.

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