

Editorial for the 12th International Symposium on Plasticity and Impact Mechanics

With human civilization, various types of engineered structures and infrastructures have been developed for the purpose of sea-, air-, and land-based industrial applications, such as ships, offshore platforms, underwater vehicles, submarines, petrochemical plants, nuclear power plants, automobiles, airplanes, buildings, bridges, and box girder cranes.

Such engineered structures and infrastructures are exposed to the actions and action effects of the operational and environmental conditions under which they are used. Although these effects are usually normal, they can be extreme or even accidental, with the latter leading to casualties, property damage, and environmental pollution. The types of actions and action effects of the extreme conditions and accidents associated with engineered structures and infrastructures can be classified as follows [1]:

- Heating and cooling processes involved with flame cutting and welding in fabrication
- Extreme actions due to rogue waves and storms at sea
- Dynamic pressure due to the sloshing, slamming, and green water in ships
- Cold temperatures in the Arctic region
- Cold temperatures due to liquefied petroleum gas (LPG) cargos
- Cryogenic conditions due to liquefied natural gas (LNG) cargos
- Ultrahigh pressure due to subsea operations
- Ultrahigh pressure due to compressed gases such as compressed petroleum gas (CPG), compressed natural gas (CNG) or compressed hydrogen gas (CHG)
- Elevated temperatures due to fire
- Springing and whipping due to abnormal waves or underwater explosions
- Blast pressure due to explosions or detonations
- Impact actions due to collisions
- Raking due to grounding by running over a hard object (e.g., rock) with a forward speed
- Penetration due to collisions or stranding
- Shaking, landslides, liquefaction, and tsunamis due to earthquakes
- Corrosion due to aging
- Cracking due to fatigue actions
- Denting due to the dropping of objects

The action effects of extreme conditions and accidents always involve plasticity and impact issues [1-4]. For safety design and engineering of engineered structures and infrastructures under extreme conditions and accidents, therefore, the issues of plasticity and impact mechanics must be essentially resolved.

The 12th International Symposium on Plasticity and Impact Mechanics (IMPLAST 2019) took place during 29th September – 3rd October 2019 in Busan, South Korea, with gathering of scientists, engineers and researchers from universities, scientific laboratories, and industries covering a wide geographical footprint to share their latest research findings in fundamental and applied aspects of large deformation and failure of materials as well as structures resulting from quasi-static and extreme loading conditions owing to impact, blast, earthquake, fire, etc. In addition to providing a platform for sharing the latest developments in plasticity and impact mechanics, the Symposium has proven instrumental in building and strengthening lasting relationships between the participating scientists.

This special issue is published with a few selected articles with high quality which were presented at the IMPLAST 2019 Symposium. As Chairman of the Symposium, I'm grateful to all of those who helped for the success of the event.

Professor Jeom Kee Paik FREng

Chairman of the 12th International Symposium on Plasticity and Impact Mechanics

Professor of Marine Technology, Department of Mechanical Engineering, University College London, London, UK

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