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Editorial

Infrastructures—An Open Access Journal

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Infrastructures are crucial components in the development of a country, enhancing the country's productivity, improving the efficiency of production, transportation, and communication. The journal considers the term infrastructures in a broad sense.

In recent decades, the advances in infrastructures have been enormous. They include the application of new construction materials, improvement of computer tools, and the development of machinery that allows us to embark on ambitious construction projects, in a safe, efficient and sustainable manner. Therefore, the future and scope of infrastructures is very promising and exciting; the concept of Smart Infrastructure is key in the development of the countries and their cities. From the old concept of infrastructure as a passive element, arises the new idea of infrastructure as active component that interacts with the users, people or machines.

Infrastructures is designed as a tool for the scientific and technical community for the communication of the research results in the topics of the journal. The aim of the open access and peer-reviewed journal *Infrastructures* is to publish regular research papers, critical reviews, and short communications in the main topics: *road, railway, coastal, airport, and energy infrastructures*.

Construction technology, maintenance, retrofitting, and management of constructed facilities [1,2]. Infrastructure lifecycle management covers the management of all core processes around planning, construction, operation, and maintenance. The life cycle of an infrastructure starts with the planning and construction phase, continues with the commercial usage and required maintenance and retrofitting, and finalizes by the demolition, dismantling or conversion of the facility.

Construction materials [3]. Research in construction materials is focused in mechanical and environmental considerations. The construction industry is the economic activity with more consumes of raw materials. Concrete is the most used construction material, being associated with around 7% of the total CO_2 emissions. Nanotechnology applications to construction have contributed to the development of high energy efficient materials (vacuum thermal insulators or silica nanogel based windows). The use of nanotechnology also enables the development of several construction materials (concrete, mortars, paints, and glasses) with self-cleaning, air depollution, antibacterial, photovoltaic capacity, or biodegradability.

Analysis of *transportation networks, logistics, supply chains, management of transport systems, intelligent transportation systems, safety, mobility and environmental concerns* have been made [4–6]. Most of the world's population live in an urban environment. Urban mobility accounts for an important part of the CO_2 emissions. The modern cities must enhance mobility and safety, while at the same time reduce congestion, accidents, and pollution.

Intelligent transportation systems include systems such as car navigation, traffic signal control systems, automatic number plate recognition, speed cameras, parking guidance, weather information, deicing, and communication cooperation on the road (*i.e.*, car to car, car to infrastructure, and infrastructure to car). In addition, predictive technologies are being developed to allow advanced modeling and comparison with historical baseline data. Applications of intelligent transportation systems include, among others, emergency vehicle notification systems, automatic road enforcement, variable speed limits, collision avoidance systems, and dynamic traffic light sequence.

Structural design, structural control, health monitoring, and prediction, non-destructive technologies, inspection, structural reliability/stability, life cycle assessment and updating, optimization, and integrity have been studied [7–9]. The process of implementing a damage identification strategy for civil engineering infrastructures is referred to as health monitoring. Damage is defined as changes to the material properties or geometry that may affect the structure strength and consequently its safety. A wide variety of highly effective local non-destructive evaluation tools are available for monitoring. Some examples are; ground penetrating radar, LiDAR, fiber Bragg gratings, ultrasonic systems, computer vision technologies, thermal imaging, eddy currents, radiography, laser profilometry, and magnetic flux leakage.

Pavement engineering [10,11] is a part of civil engineering that is focused to the design, maintenance, and rehabilitation of asphalt and concrete pavements from streets and highways. It involves research in soils, hydraulics, and material properties. The main research topics in pavement engineering include construction techniques and strategies, novel design approaches, rehabilitation and preservation, pavement life cycle, testing techniques, and pavement management systems.

Railway engineering [12,13] is a multi-faceted civil engineering discipline dealing with the design, construction, and operation of railway infrastructure. It joins a wide range of engineering disciplines, including construction, computer engineering, electrical engineering, mechanical engineering, and aerodynamics, among others. The new transportation systems (high-speed rail, tilting trains, digital signaling, and driverless subways) developed in the last decades are now mature technologies. Future technological developments in vehicle track design include active suspension, improvement of aerodynamic performance, and novel track systems, including magnetic levitation.

Bridge engineering [14–16] research drives the use of new construction methods, components, and materials, including accelerated bridge constructions, construction in seismic regions, integration of prefabricated materials, adaptation to climate change, inspection techniques, safety, management, retrofitting, and demolition.

Tunnel engineering [17,18] major impacts are related with the design of tunnel liners and waterproofing systems. Tunnel boring machines have continuously progressing in speed, adaptability, and safety. The growth of cities will continue to drive the need for new tunnels. Transportation tunnels must respond to high speed rail, subway networks, and water supply and drainage requirements.

Dam engineering [19–21] includes aspects as planning, design, construction, and maintenance of dams and barrages. It includes methods of analysis and modeling aspects of loads, structure, reservoir and foundation, fluid flow, joints, cracks, climatological effects, mass concrete, embankment material, new materials, rock foundations, fracture, refurbishment of dams, and interaction between civil and mechanical structures.

Port and marine engineering [22,23]. The design, management and maintenance of coastal structures combine various disciplines such as structures, oceanography, meteorology, fluid dynamics, sedimentology, statistics and computer science, including the use of coupled theoretical, numerical and experimental approaches. Marine dynamics and morphological variations in beaches are also important areas.

Geotechnical engineering [24,25] is often the starting point for studies in civil engineering. Geotechnical aspects affect the development of the project and construction works. It covers topics such as foundations, retaining structures, soil dynamics, slope stability, rock engineering, earthquake engineering, environmental geotechnics, and groundwater monitoring and restoration.

Survey engineering [26–28] is a critical activity related with civil engineering. It includes areas such as construction surveys, control surveys, deformation measurements, and inventory surveys, using measurement tools based on photogrammetry, light detection and ranging, global navigation satellite systems, inertial measurement units, and total stations, combined with computer processing (geographical information systems, computer aid design, and point cloud software).

Computers applications in civil engineering have evolved considerably since the 1970s until today [29], from the first support provided in calculation and drawing to the recent developments in artificial intelligence, data mining, machine learning, parallel processing, cloud computing, big data, graphics, imaging, and information technology [30–32].

Smart infrastructures [33] can monitor, measure, analyze, communicate, and act based on information gathered from sensors. A smart infrastructure responds intelligently to changes in its environment to achieve an improved performance. Applications of smart infrastructure include utilities, energy, water, and transport.

Sustainable infrastructure [34,35] refers to the designing, building, and operating in ways that do not diminish the social, economic, and ecological process required to maintain human activities, diversity, and functionality of natural systems. Key infrastructures areas related with sustainability development are energy, transportation, waste management, and land use planning.

Ageing infrastructure [36,37] present important requirements in the field of maintenance and safety. The use of advanced computational techniques in damage and vulnerability assessment, non-destructive technologies for inspection, and retrofitting techniques appears as the major topics, combined with climate adaptation, stone pathologies, corrosion, resilience to extreme events, fatigue life, hazard mitigation, life-cycle performance, safety, stochastic control, and structural health monitoring.

Climate change will impact in infrastructure and can put their operation and reliability partially at risk [38,39]. Main treats to infrastructure include damage or destruction caused by *extreme weather events* (*i.e.*, coastal flooding from sea level rise, changes in patterns of water availability, extreme storms). Climate change will increase the costs from infrastructure investment over the coming decades. One example is the need for additional infrastructure, dedicated to climate protection (*i.e.*, water defenses for flood protection, interconnections in water supply) and retrofitting to improve resilience of existing infrastructure.

Automation and robotics [40,41] in construction provides safety and higher level of efficiency and quality. Robots radically reduce constructions costs, increase construction speed, lower the insurance costs for builders, and increase sustainability over the infrastructure lifetime.

Infrastructures is an Open Access journal that covers a broad range of topics related to infrastructures. It offers an opportunity to researchers, developers, and end users. The Editorial Board consists of a team of experts in the field. The journal guarantees the quality of the published works with the peer-review process.

Infrastructures encourages researchers worldwide to contribute original research and technical manuscripts on the topics described above, and take the opportunity to share the findings and contributions on these topics with the research community. The cooperation of everyone involved will result in the success of the initiative.

Author Contributions

Pedro Arias contribute in the revision of the following topics: construction technology, maintenance, retrofitting, a management of constructed facilities, constructions materials, pavement engineering, railway engineering, bridge engineering, tunnel engineering, port and marine engineering, geotechnical engineering, survey engineering, sustainable infrastructure, ageing infrastructure, and climate change. Higinio González-Jorge contribute to the following topics: transportation networks, logistics, supply chains, management of transport systems, intelligent transportation systems, safety, mobility and environmental concerns, computers applications in civil engineering, smart infrastructures, automation, and robotics.

Conflicts of Interest

The authors declare no conflicts of interest.

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