Editor's Note on Volume 6, Issue 3 of the Journal of Civil & Environmental Engineering

Mandar K*

Boise State University, USA

*Corresponding author: Mandar K, Boise State University, USA, Tel: +1 208-426-1000; E-mail: mkhanal@boisestate.edu

Editor's Note

This issue of the journal contains ten research articles, two case reports, and one short communication covering a wide variety of topics of interest to civil and environmental engineers. Presented below in chronological order is a broad overview of topics covered in this issue.

The first article in this issue by Mangnoni et al. presents the effects, at laboratory scale, of geometry, mineralogy, and shape of aggregates as well as the volumetric characteristics of mixtures on the friction performance of slab-shaped asphalt samples, in terms of British Pendulum Number (micro texture) and Mean Texture Depth (macro texture). The authors surmise that geometry, in terms of fine aggregate content, is the most significant parameter that influences micro texture. An increase of BPN was also observed according to the increase of basalt, even if less evident when compared to the effect of fine aggregate. On the contrary, MTD was found to decrease according to fine and basalt content. Regarding shape, the increase of non-polyhedral particles into the mixtures was found to be detrimental in terms of micro texture but found to play a positive role in raising the macro texture. Compaction characteristics (void contents) were found to produce a general BPN increase and MTD decrease.

The article by Abdrabbo et al. presents a study of the properties of water mist droplet using a fire dynamic simulator (FDS). The FDS was used to model a room fire scenario to investigate and compute particle distribution, droplet velocity, mist flux, and droplet size. A numerical simulation for a model room with a single water mist nozzle was conducted in order to study the droplet characteristics. The study found that flux of water and the droplet speed is highest at the center of the spray.

The article by Mia and Amanat presents results on their finite element investigation of a bolted extended end-plate connection subjected to variation of temperature. They studied the effect of temperature on beam to beam joints; effects on end-plate moment connection were also investigated. A temperature range from 20°C to 649°C was considered. They found that the end plate thickness does not vary with increase of temperature but stiffness reduces considerably.

Subash et al. describe how pre-grouting can improve rock mass strength and restrict water ingress to acceptable levels in underground construction, such as tunnels constructed below ground water table. Some of the key risks tunnel projects face due to water ingress and rock mass instability are slowing down of construction, need to install support systems, durability of lining systems, and overall hindrance to safe operation. The article shows that a properly planned pre-grouting can improve rock mass strength and establish an impermeable zone around the tunnel periphery.

Hamdi et al. demonstrate that drought frequency analysis cannot be performed appropriately through univariate analysis, which treats relevant variables such as drought severity and duration as uncorrelated variables. Using data from the Medjerda River basin in Tunisia, they show that the two variables have a correlation coefficient greater than 85%. So they developed a joint distribution of these variables and fitted the data to a three-parameter Log-Pearson distribution function. Copulas were employed to construct the dependence structure for the severity and duration of drought.

Zhu and Huang present an article that uses a stochastic approach to optimize budget and schedule in construction management. They developed an interval parameter two-stage stochastic model for project budgeting and scheduling to deal with the uncertainties residing in project management. The model focused on the probability distribution in activity durations and the uncertainties expressed as intervals in costs. It minimizes the inexact costs (direct costs, indirect costs and penalties) with reference to the specified project completion time and the durations of activities estimated from two-stage stochastic programming. The proposed approach for budgeting and scheduling is a hybrid of two stage stochastic programming and inexact optimization. The developed model is applied to a case study to illustrate its feasibility of dealing the actual project management decision problems. The model provides a systematic framework that facilitates the decision making process and enables project managers to justify the range of the solutions when the decision variables are intervals.

Boddu et al. provide a Case Report on the environmental impact assessment of a proposed 2640 MW thermal power plant in Sompeta Village in India. Currently, coal is the only natural resource and fossil fuel available in abundance in India. India has about 90,000 MW installed capacity for electricity generation, of which more than 70% is produced by coal-based thermal power plants. Hydro-electricity contributes about 25%, and the remaining is mostly from nuclear power plants. The problems associated with the use of coal are low calorific value and very high ash content. The ash content was found to be as high as 55– 60%, with an average value of about 35–40%. Most of the coal is located in the eastern parts of the country and requires transportation over long distances, mostly by trains, which run on diesel. About 70% oil is imported and is a big drain on India's hard currency. Their paper evaluates an Environmental Impact Assessment (EIA) using the Rapid Impact Assessment Matrix (RIAM). Four components: physical / chemical, biological / ecological, social / cultural, economic / operational were considered and evaluated using a universal criteria common to all impact consideration.

The second Case Report in this issue is presented by Majod Javari who reports on geostatistical and spatial statistical modeling of precipitation variations in Iran. The study examined the geostatistics

and spatial relationships between annual, seasonal and monthly rainfall in Iran for the period 1975-2014. Precipitation variation models were compared in Iran deriving from six geostatistical, four regression and five spatial models, using monthly data. A geostatistical and spatial statistical analysis consisting of two measurement sub-models was created based on monthly accumulated precipitation. The results of the new geostatistical-spatial statistical analysis model showed that average monthly precipitation series in Iran were revealed to follow the Gaussian distribution. The findings also indicated that among the rainfall data which were influential on precipitation, seasonal then monthly and annual precipitation had the highest spatial variations on the rate of precipitation. The hypothesis for the geostatistical - spatial variations of the rainfall in Iran was accepted. The geostatistical-spatial model was able to show the magnitude of these variations on the precipitation rate changes and examine the variation patterns.

Donald Gray presents a Short Communication on the effect of slope shape on soil erosion. He provides answers to questions, such as: Why do most natural slopes have curvilinear rather than planar profiles? What slope shape is best suited for minimizing erosion losses .... convex, concave, compound (convex-concave), or planar (uniform)? Why are most man-made slopes constructed with planar surfaces and uniform gradients? From field observations in Colorado and laboratory tests he concludes that concave slope profiles appear to be more stable and generate less sediment than uniform, planar slopes. These findings are consistent with conceptual models and they also accord with results of computer modeling of soil erosion on slopes with irregular shapes and with time evolved digital terrain models.

Bingqi Zhu's research article presents results from an investigation on natural water quality and its suitability for drinking and irrigation in the Jungar Basis of Central Asia. The research found that the ionic chemistry of natural waters from the basin changes considerably on a regional scale. The waters were neutral to alkaline and most of them were soft-fresh waters. The total dissolved solid (TDS) varied over two orders of magnitude. Much of the solutes and physicochemical parameters in water were under the highest desirable limits of the World Health Organization (WHO) for drinking purpose and a relationship between sodium adsorption ratio versus EC shows that most waters are of good water quality for irrigation. The effects of local pollution were found to be minimal in the montane and piedmont areas of these watersheds but were significant in the oases and central areas of the drainage basins.

Kardasz et al. present an article on drones and possibilities of their use. The construction of the drone is discussed first. Important elements such as the frame, propellers, engine, system of power the electronic control and communication system are covered. A comparison of military and civilian drones is also presented. Military drones differ from civil in size and drive. They are bigger and powered by internal combustion engines. Civil drones are driven by electric motors. Drones can be used for public service (such as, police, fire brigades, border guards, etc.), military service, industry, miscellaneous purposes such as photography and filming, and to deliver shipments.

There are also potential dangers in the use of drones. The main danger is the fall of a drone from a great height, which may be due to failure of the battery, weather conditions (low air temperature, precipitation), and impact with an obstacle (tree, building, high-voltage line). Privacy and the rights of citizens should also be considered.

Kyziol-Komosinska et al. write about the impact of different washing conditions on the release of silver (Ag) from textiles into a washing solution under different conditions. The released Ag amount was found to depend on various factors, such as test media (chemical composition, temperature and water volume), metal contents, and textile impregnation conditions. Furthermore, they found that the textile type and color were the main parameters affecting the Ag release. The Ag concentration in the washing solution ranged between 0.015 µg/l and 4.44 µg/l (socks) and between 0.61 µg/l and 103 µg/l (AgNPs–filled cotton). The total Ag percentage released into water during one washing varied considerably among textiles (from less than 1 to 34%). In the tap water presence, the released Ag load decreased from 6.82 to 1.35 µg/l due to the $AgCl$ and/or Ag_2CO_3 precipitation. The bleaching process had a strong effect on the quality and speciation of Ag released during the washing process. The washing of nano–Ag–treated textiles can potentially release both ionic and particle forms as smaller AgNPs dissolved more rapidly than large AgNPs. The results of their study demonstrated that the water solution containing Ag revealed a toxic effect on D. magna and V. fischeri. Among the tested species, D. magna was the most sensitive and revealed acute toxicity for low EC50 values. The V. fischeri response was less sensitive due to the physiological state of the bacteria.

Hill et al. present results from their evaluation of the effects of drive-through configurations on air quality at fast food restaurants. Drive-through users at fast food restaurants stay in their vehicle and have the engine running instead of walking into the restaurant to place an order for food or beverage. Although the drive-through facilities are convenient, and they save time for costumers, they may have negative impacts on air quality. Idling vehicles waiting in lines at drive-through facilities waste gas, harm air quality, and increase greenhouse gas emissions. The study examined the emission rates at three fast food restaurants in Houston, Texas, with different drive-through configurations. By driving on each drive-through facility in two different times of the day (peak hours and non-peak hours), instantaneous speed and acceleration of vehicles were collected on a second-by-second basis using Global Positioning System (GPS) devices. Then, for each second-by-second data, Vehicle Specific Power (VSP) value was calculated using instantaneous speed and acceleration. VSP and instantaneous speeds of the vehicles were used to obtain the operating mode distribution bins according to the standard provided by the Motor Vehicle Emission Simulator (MOVES). The vehicle emissions were calculated based on the operating mode binning approach. Emission factors analyzed in their study were Carbon Monoxide (CO), Carbon Dioxide (CO_2), Oxides of Nitrogen (NOx), and Hydrocarbons (HC). The results of the study showed that the estimated emission is lower at drive-through facilities with fewer stops and number of lanes.