SATC 2012: Green Rating

Giving infrastructure projects a green rating: how to design 'green' from the inside out

As we face significant challenges issues such as climate change and global warning, it is clear that the engineering profession has a significant part to play in influencing the future of our planet. Whatever we may think about environmental responsibility, we can be sure of this: that we all need, and will continue to need, reliable energy, safe drinking water, clean air, non-hazardous waste disposal, and sustainable, accessible transportation and other infrastructure.

Shian Hamraj Saroop, a Civil Engineer and a specialist in Green Township infrastructure Services, is speaking at this year's Southern African Transport Conference from 9 to 12 July about establishing a green rating system on civil engineering infrastructure projects.

Saroop says each of these interventions and services requires the input of the engineering profession, he added that it is no longer possible to practice as a professional engineer and ignore the challenges and opportunities that arise from the need for sustainable development.

'Engineers will need to be at the forefront of developments. Whether in finding ways to maximise water capture or ensuring conservation of a resource from supply through to distribution, innovation, technology, design, and management will be crucial for the engineer in meeting future challenges,' said Saroop. In designing for sustainable development, engineers will need to practice sustainability. Saroop says that engineers play a major role in the structuring of infrastructure projects, and the lack of sustainability systems or tools has led to poor design solutions that continue to degrade the environment.

Globally, the construction industry is one of the main contributors to the depletion of natural resources and a major cause of unwanted side effects such as air and water pollution, solid waste, deforestation, health hazards, global warming, and other negative consequences.

In order to stay competitive and to meet upcoming stricter environmental regulations and customer requirements, designers have a key role in designing civil infrastructure so that it is environmentally sustainable. These and other factors have compelled the engineer to design with greater care and in more detail.

The lack of appropriate tools and skills for sustainable deign has often been quoted as a barrier to sustainable design, and a systematic and iterative analysis of the environmental impact of various design solutions is commonly suggested for infrastructure projects, but rarely happens.

Mainstreaming environmental aspects and incorporating the eco-efficiency concept into various stages of infrastructure development have not been considered as much as they should have been. Engineers need to look at greener technologies rather than just using traditional engineering solutions.

Sighting an example, Saroop says civil engineering projects can have significant site-specific and cumulative impacts on ecological and social systems if not correctly planned, designed and implemented. There is therefore an urgent need for an eco-sensitive infrastructure design rating system that encourages and promotes the use of 'softer' design solutions.

Relatively few design engineers have explored the transformative potential of ecological design and have preferred to remain apolitical and unconcerned with the distributional impacts of design as they affect the health of humans and ecosystems.

South Africa has recently adopted green building guidelines, and green building ratings, but these place little emphasis on the environmental performance of civil engineering infrastructure. What we need in addition is a decision-making toolkit that assesses the environmental impacts of infrastructure design decisions on development.

Diligent attention to greener infrastructure solutions from the very earliest phases of a project will help guarantee that quality design environmental solutions are 'built in' from the beginning. It is important to implement the environmental management from the early stages of the process, since the freedom to make decisions of importance for the environment decreases with the progress of each project.

'What is needed is what we have called a 'Green Township Infrastructure Design Toolkit', which uses the concept of eco-efficiency and would allow the designer to evaluate design options, choosing the one likely to yield the best performance with the least environmental impact, based on proven technology', says Saroop.

Such a Toolkit is intended to encourage developers to consider green methods and practices in the earliest stages of project planning, by assessing a number of recommended green practices and its environmental impacts on infrastructure services design, placing fewer burdens on the environment. He adds that this Toolkit would enable the client to select a combination of alternatives and evaluate a number of possible design options – with their environmental implications – at each stage of the design process.

During the briefing and preliminary design stage, the client and engineer have a joint responsibility of deciding just how green the project should be, or alternatively of deciding what environmental quality of services can be provided. During the detailed stages, the engineer has the responsibility of designing, while maximising the green value of the project. The designers also have an opportunity to add environmental value at the construction stage, by analysing eco-friendly construction materials.

Green township infrastructure technologies have significant benefits: they are able to contribute to greenways and green corridors and provide linkages between habitats, and wetlands, as well as conserve natural resources, reduce the ecological footprints of roads, sewer, storm-water and water, allow ecosystems to function more naturally; use energy-efficiency systems and materials; minimise surfaces reducing soil erosion; conserve and reuse water; and treat storm water runoff on-site.

Taking a greener approach to infrastructure development not only mitigates the potential environmental impacts of development but makes economic sense as well. By softening the environmental footprint, avoiding waste and finding efficiencies, clients and local governments can only increase their long-term sustainability.

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