Session Report:

TRANSPORTATION

Chairperson: Dr. Kyong-Soo YOO (Korea Highway corporation, Korea)
Secretary: Mr. Ikuo HARAZAKI (Miyaji Iron Works Co,. Ltd., Japan)

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Strait Crossing Projects in Japan
by Dr. Satoshi Kashima
Future Outlook for Trench-less Pipeline Rehabilitation Technologies
by Dr. Jey K. Jeyapalan
Shinkansen Railway Network in Japan
by Mr. Hiroshi Kanazawa

Dr. Satoshi Kashima

Dr. Jey K. Jeyapalan

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1. Summary

This summary highlights key issues from the three papers presented in Transportation Session. The authors pointed out socio-economic and technical advance in interesting infrastructure projects and a forward-looking view to technologies for improving construction and maintenance practices.
Dr. Satoshi Kashima of Honshu-Shikoku Bridge Authority discussed Strait Crossing in Japan.
Dr. Jey K. Jeyapalan of American Venture Inc. addressed Future Outlook for Trench- less Pipeline Rehabilitation Technologies.
Mr. Hiroshi Kanazawa of Japan Railway Construction Public Corporation spoke on Shinkannsen Railway Network in Japan.

Dr. Satoshi Kashima of Honshu-Shikoku Bridge Authority addressed Strait Crossing Projects in Japan.

With the first completion of a railway tunnel in 1942 between Honshu and Kyushu (currently two railway tunnels and one highway tuneel and two highway bridges), followed by Seikan Railway Tunnel in 1988 between Honshu and Hokkaido, and Seto-Ohashi Bridges in 1988 between Honshu and Shikoku, Japan's four major islands were connected with fixed links. These strait crossing projects have provided safe and reliable transportation network in the regions, and brought about remarkable socio-economic impact in Japan.
To ensure safe and cost-efficient construction of Honshu-Shikoku Bridge Project with three separate routes including Akashi Kaikyo Bridge, Tatara Bridge, and the Seto-Ohashi Bridges classified to the world longest spans, a lot of technological developments had been made. Seismic design, wind-resistant design, and new construction method of substructures in deep sea are the representative examples. Regarding maintenance technologies, more efficient inspection for long-span bridges and an innovative corrosion protection system for suspended main cable are among the most important advancements.
For future long-span bridge projects, advanced technologies, such as two-box girder with longitudinal open grating at the center of the girder, are indispensable to be developed.

Dr. K. Jeyapalan of Pipeline Engineering Consultant spoke on Future Outlook for Trench-less Pipeline Rehabilitation Technologies.

Trench-less pipeline rehabilitation technologies featuring no or least open-cut ground excavation in and around the job site can minimize the disruption and inconvenience in citizens' daily lives. The trench-less pipeline renovation business in the US has matured significantly in this decade. About 30% of the pipe renovation work needed have been carried out using the trench-less methods.
The pipe renovation market in the US, such as in the field of municipal sewer, potable water, gas, and crude oil and product, is expected to grow significantly. It is because of aging underground infrastructures, doing more work with less funds, protecting the environment, increasing in population in urban and suburban centers, growing needs for water, energy, and waste handling, and other factors.
The engineering and contracting environment would be more complex and different. The pipe renovation business in the municipal market is a highly competitive industry with decreasing prices for most technologies.

Technological innovation and its validity including real time information accumulation and application using internet, synergy among operators and owners, and the view point of global economy will have a profound effect on the entire pipeline rehabilitation industry, where most knowledge base and resource base would be shared.

Mr. Hiroshi Kanazawa of Japan Railway Construction Public Corporation discussed the current Shinkansen Railway Network in Japan.

Currently the railway system in Japan extends to 17,900 km nationwide, of which 2,150km are the rapid transit railway system (Shinkansen) with five lines. The first Shinkansen started operation in 1964 between Tokyo and Osaka. Since its opening Shinkansen system has upheld its record of almost no passenger fatalities due to accident. The maximum train speeds vary from 260km/h to 300km/h.
Among various transport modes of passenger travel between Tokyo and Hakata, Shinkansen is highly competitive with others for distances between 200 km to 800 km and even up to 1000 km. Shinkansen network has been showing remarkable socio-economic effects on the cities along the routes in addition to the environmental friendly feature with lower energy consumption and lower carbon dioxide emission than other transport modes.
Three new routes with 640 km in total are under construction by Japan Railway Construction Public Corporation. The funding for the construction is shared 65% by National government, 32% by the related local governments and the rest 3% by rental fee of Shinkansen operators. Since only 60% of the total planned Shinkansen network is currently in service, further construction is expected in the future, which are in need of cost reduction, technical innovation and comprehensive technology, as well as reduction of construction period.

2. Conclusion

Infrastructure plays a key role in the economic development of a nation as well as in the improvement of quality of life.
Through the presentations, it is learned that the strait crossing by highway and railway and the rapid railway network have greatly supported socio-economic development of Japan, and that the trench-less pipeline rehabilitation technologies are widely adopted to minimize the inconvenience in citizen's daily lives in the US.
Technological innovation will have a profound effect on such infrastructure developments. Maintenance and rehabilitation of their network is also an important issue to be tackled by applying various kinds of technical innovations.

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