Session Report:

PROJECT II

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Construction Management of Shihlin Hydropower Project
by Mr. Chi-Shou Hsieh

A Full-Scaled Crash Test to Develop Roadside Safety Features in Korea
by Mr. Bong-Jo Chung

The Damage of the City Establishment Due to the Volcanic Eruption of Miyake Island and the Restoration
by Mr. Sentaro Takagi

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Mr. Bong-Jo Chung

Mr. Sentaro Takagi

1. Summary

This summary highlights technically interesting issues of various projects, presented at this session on Project II in Construction Management. The authors presented practices of the project management system in their respective projects. Their presentation titles are as follows.

1) Chi-Shou Hsieh (Sinotech Engineering Consultants, Ltd., Taiwan):
Construction Management of Shihlin Hydropower Project
2) Bong-Jo Chung (Highway Research Center, Korea Highway Corporation, Korea):
A Full-Scaled Crash Test to Develop Roadside Safety Features in Korea
3) Sentaro Takagi (Tokyo Metropolitan Government, Japan)
The Damage of the City Establishment Due to the Volcanic Eruption of Miyake Island and the Restoration

Mr. Hsieh explained details of the construction management system of the Shihlin hydropower project, which is under construction and planned to complete in 2002. The project has been implemented very satisfactorily, because the sound construction management has been carried out for overcoming many difficulties encountered during the construction period.

Mr. Chung showed his actual experience on a full-scaled crash tests conducted for developing roadside safety features. In 1994, the first full-scaled car crash test related to the development of crash cushions was started. The test data could be continuously acquired since 1996, and then a lot of prototype crash tests for roadside safety features have been achieved regularly.

Mr. Takagi explained the most suitable restoration plan for infrastructures, which were damaged by the eruption activities of Miyake Island. Both roads and houses were destroyed and buried by mud and debris flows caused by the eruption. The flows occurred in the whole area of the island and the damage was continuously increased.

2. Presentation Highlights

Shihlin hydropower project mainly comprise of a concrete gravity dam, an intake of morning glory type, a power tunnel, a restricted orifice surge tank, an inclined underground penstock, a underground power cavern and a tail tunnel. Main tasks of its construction management is to manage all the construction activities at the site; quality control which is divided into three levels for execution; process control, quality control and quality assurance; schedule management and control which is divided into two stages, namely, review and following-up stages; cost control which consists of the total budget and annual budget disbursement schedule before commencement and the annual budget disbursement during construction; jobsite safety and sanitation management which is executed area-by-area with very clear responsibility assigned; environmental protection management which is carried out for control of any environmental contamination issues.

Mr. Hsieh explained two cases of construction management; power tunnel excavation at the downstream section which is about 3,500 m out of 5,500 m of the total tunnel length, and methane gas emitting accident.

Full-scaled car crash tests related to the development of roadside safety features have been conducted in Korea. Since 1998, Manual on Installation and Maintenance of Highway Features has been largely updated; namely, the guidelines for crash cushions and median barriers were updated in 1998 and bridge railings in 1999. New safety features must meet theses safety performance

evaluation criteria.

Mr. Chung explained the crash test facilities consisting of pulling system, guide rails, structures and data acquisition system. He also introduced some products evaluated through the test; these are; crash cushions, impact absorption type median barrier, iron bridge railing, drop prevention type longitudinal barrier and new crash cushions.

Eruption activities become active around Mt. Oyama in Miyake Island, which is almost circular in the island shape with about 8 km in diameter, and located about 180 km to south-southwest of Tokyo. In June 2000, pyroclastic flow of the low temperature occurred, and a new crater with 1,500 m in diameter and 450 m in depth was created in calderas of the mountain summit in August. Miyake Island shoots up smoke of 1,000 - 2,000 m high every day, and exhausted much volcanic gas containing hydrogen sulfide, sulfur dioxide, chlorination hydrogen, and so on. The accumulated amounts of sulfur dioxide, volcanic ashes were about 20,000-50,000 t, 11,000,000 m^3, respectively, by this time.

Damages due to the volcanic activities were noted in many facilities in Miyake Island; houses, roads, water service equipment, harbors, airport, swamp bank, etc. Mr. Takagi reported the restoration activities for those; shelter for the emergency evacuation constructed at thirty places; provisional mooring facilities installed in two ports; two heliports constructed temporarily; roads restored in three stages (temporary, emergency and permanent); debris flow protection facilities restored temporarily and a provisional waterway and a floor block installed.

3. Conclusion

Through these presentations, various issues on construction projects brought out the following results.

Mr. Hsieh concluded that an effective construction management was deemed very essential for successful implementation of Shihlin hydropower project as the construction management would affect directly the schedule, quality and cost. He further added that construction management can not only control the schedule, quality and cost, but also minimize risk of accidents.

Mr. Chung was going to do various studies on roadside safety features such as transition section, end treatment, breakway as well as barriers. He also mentioned that he would do not only vehicle crash tests but recognition, durability, driver's response tests for delineators and lightings, outdoor tests for various road signs, pendulum tests for various shape of posts.

Mr. Takagi finally proposed the most suitable restoration plans for roads and other infrastructure facilities and enforced the countermeasure against the mudflow to mitigate the devastation of Miyake Island.

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