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and Manufacturing Engineering



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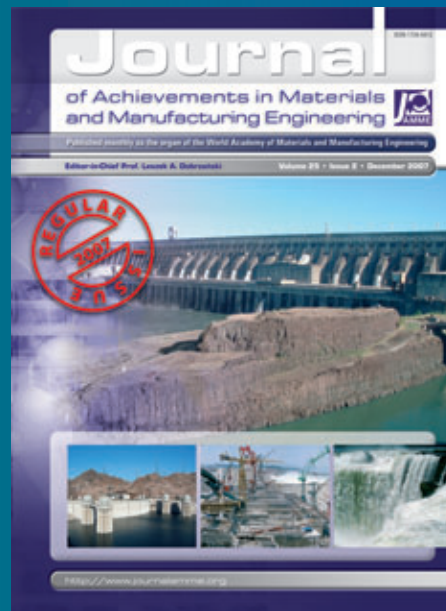
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Cover story

The Colorado River Basin in the United States of America periodically overflowed its banks when snow from the Rocky Mountains melted and drained into the river. In 1922 a commission headed by Herbert Hoover, then a Secretary of Commerce was formed to resolve the problem. In result of that the state governors of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming participating in this commission, on 24th November 1922 signed Colorado River Compact known also as the Hoover Compromise to split the river basin into upper and lower halves with the states within each region deciding how the water would be divided. This agreement paved the way for the Boulder Dam Project. The initial appropriation for construction of Boulder Dam was made in July 1930, by which time Herbert Hoover had



become a President of the United States of America. The dam, originally planned for a location in Boulder Canyon, was relocated to Black Canyon of the Colorado River for better impoundment, but was still known as the Boulder Dam Project. The work on the project started on 7th July 1930. The project began officially on 17th September 1930. A Congressional Act of 14th February 1931 officially named "the Hoover Dam" to honour the then President of the United States of America. Hoover Dam is a concrete gravity-arch dam located 48 km southeast of Las Vegas on the border between the United States of America states of Arizona and Nevada. The dam is 221.4 m high and is the second highest dam in the United States, because only the Oroville Dam is taller. The dam length is 379.2 m, its thickness – 200 m at its base and 15 m at its crest. 3.33 million m³ of concrete were used for the dam construction. It began in 1931 and was completed in 1935, over two years ahead of a schedule. The Lake Mead is the reservoir created behind the dam, named after Elwood Mead, who oversaw the construction of the dam. The Lake Mead has area of 639 km², backing up 177 km behind the dam and has 35,200 km³ of the volume (full pool) at an elevation of 372.3 m. Generators at the Dam's Hoover Powerplant began to transmit electricity from the Colorado River a distance of 428 km to Los Angeles, California on 26th October 1935. Additional generating units were added in 1961. Water flowing from the Lake Mead through the gradually-narrowing penstocks to the powerhouse reaches a speed of about 140 km/h when it reaches the turbines. Usually, no spillways or bypasses are utilised and all the flow of the Colorado River passes through the turbines. The seventeen main turbine-generator combinations at this powerhouse generate a maximum of 2,074 MW of hydroelectric power. Traffic across the dam is 13,000 to 16,000 people each day, with 8 to 10 million visitors each year. The dam and the power plant are listed on the National Register of Historic Places in 1981, and were designated a National Historic Landmark in 1985. The construction of the Hoover Dam project was included in 2003 by the BBC to the Seven Wonders of the Industrial World. You can see the Hoover Dam on the one of the small photos on the cover.

On the main photo on the cover you can see the Itaipu Power Plant as the largest operational hydroelectric power plant in the world, located at the Brazilian-Paraguayan border and not far from the Argentinean border. The installed generation capacity of the plant is 14 GW, with 20 generating units of 715 MW each. Each year the Itaipu Power Plant generates 75 TWh of electricity. In 2000 it achieved its generating record of 93.4 TWh. Total energy production per 23 years is 1,483.6 TWh. The concept behind Itaipu Power Plant is the result of heavy negotiations between two countries during the 1960s. The "Ata do Iguacu" (Iguacu Act) was signed on 22nd July 1966, by the Brazilian and Paraguayan Ministers of Foreign Affairs. On 26th April 1973, two governments of the states signed a treaty "for the development of the hydroelectric resources of the Paraná River" and founded "ITAIPIU Binacional" as a company that runs the Itaipu Power Plant. It is a binational undertaking run by Brazil and Paraguay at the Paraná River on the border section between two countries, 15 km north of the Friendship Bridge. The project ranges from Foz do Iguacu, in Brazil, and Ciudad del Este in Paraguay, in the south to Guaira and Salto del Guaira in the north. The name "Itaipu" was taken from an isle that existed near the construction site. *Itaipu*, from the Guarani language, means "singing stones". The construction work started in 1975. 12.8 million m³ of concrete was used for the project ITAIPIU. The height of the dam reaches 196 m, its length 7.76 km. The lake created by this is 170 km long and contains 29 billion tons of water. Its area reaches 1,350 km² and its average width – 7 km. The maximum flow of Itaipu's spillway is 62.2 thousand m³/s, it is equivalent to 40 times of the average flow of the Iguacu Falls. The Itaipu Dam is listed as one of the Seven Wonders of the Modern World, in a list compiled in 1995 by the American magazine Popular Mechanics.

One should think that in 2009 Itaipu will loose its dominating position in the World.