

Key Issues:

3- Fish Migration and River Navigation

Climate Zone:

Cf: Temperate Humid Climate

Subjects:

- Adoption of Combined & Big type Fish-ladder

Effects:

- Reduction of Impacts to Fish-Living-Environment

Project Name:

Maan Dam

Country:

Taichung Prefecture,
Republic of China (Asia)
(N 24°11', E 121°56')



Implementing Party & Period

- **Good Practice:** Taiwan Power Company
1998 -

Key Words:

Efficient Operation of Hydropower Plants, Combined and Big Fish-ladder,
Fish-Living-Environment

Abstract:

The Maan Hydro Project includes Taiwan's first Combined and Big Fish-ladder construction. It was planned to minimize the impacts on fish- living- environment, which was prospected to made in connection with the Project, and effects of it has been evaluated by some researches.

1. Outline of the Project

In 1979, the number of power plants located on the Tachia, one of Taiwan's major rivers, was five: the Techí, Chingshan, Kukuan, Tienlun and Shihliao in the order from upriver to downriver, and their maximum output totaled 972,000 kW. Since the water passage capacity (68 m³/s) of the tunnel of the Tienlun power plant, which is downstream, was smaller than those of the upper-stream ones and the capacity of its regulating pondage was also small, operation of the latter during peak hours was limited. To solve this problem and ensure effective use of the water resource of the entire river, the construction of the New Tienlun and the Maan power plants was planned. Particulars of the Maan power plant are shown in Table 1.

The Maan power plant takes water from the Maan dam built about 900 m downriver from the outlet of the New Tienlun power plant and discharges into Tienlunhouch'ih. The construction work included building new power generation facilities between the Maan dam and the outlet and improving the facilities around Tienlunhouch'ih. For the construction of this power plant, much consideration was

given to the environment as illustrated by a large fish ladder, the first built in Taiwan, and the ISO 14001 authorization obtained in 1998.

Construction of the Maan power plant began in 1992 and operations began in 1998.

Table 1 Specifications of Maan plant

Item		Specification
River System		Tachia
Catchment area		916.4 m ²
Power Plant	Max. output	133,500 kW
	Max. discharge	144.5 m ³ /s
	Effective head	106.08 m
Dam	Name	Maan
	Type	Concrete gravity
	Max. embankment height	41.00 m
	Max. width	239.50 m
Reservoir	Effective storage Capacity	965,000 m ³
	Effective storage Capacity	575,000 m ³
	Available depth	3.4 m
Headrace tunnel	Length	7,477 m
	Inner Diameter	φ 6.4 m

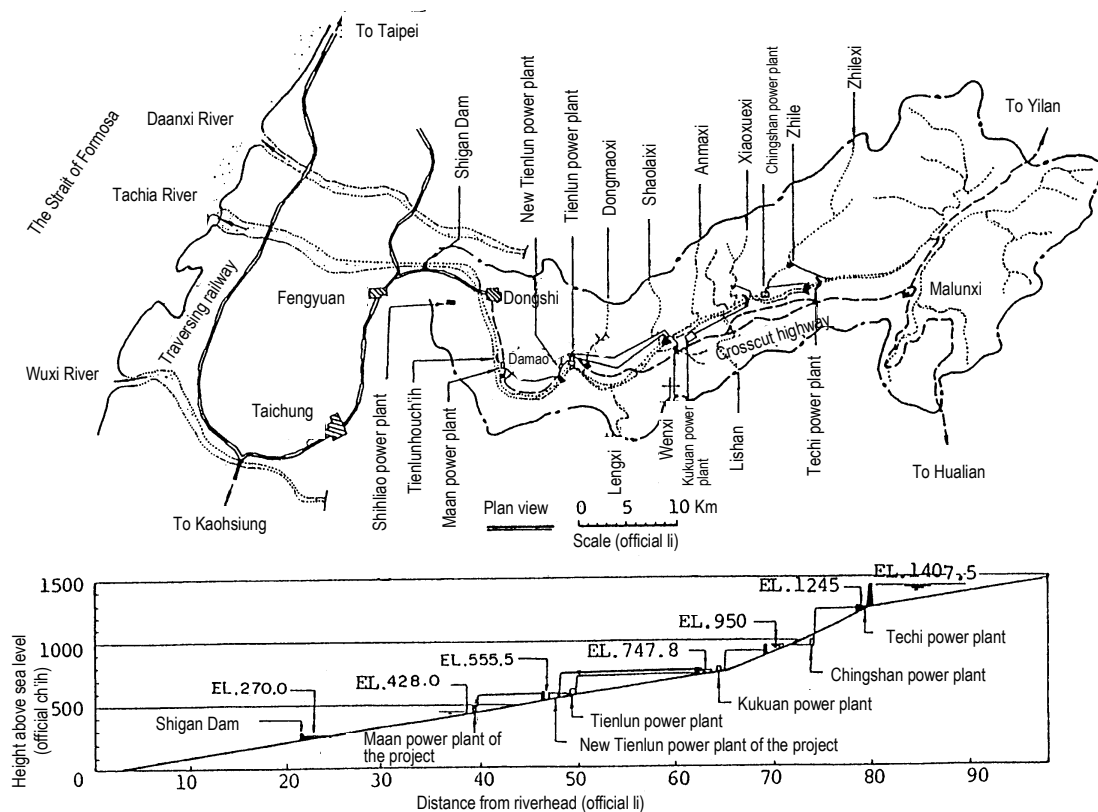


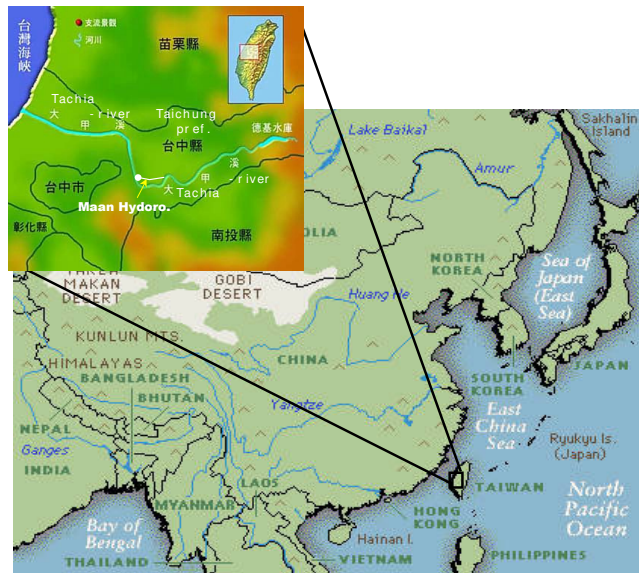
Fig. 1 Outline of Power Plants on the Tachia

2. Features of the Project Area

The Maan power plant is about halfway down the Tachia River, which runs from east to west in the central part of Taiwan. The average precipitation of the region is 2,459 mm a year and temperatures average 22.4°C.

The source of the Tachia is Mt. Nanhudashan (3,740 m above sea level) of the Central Mountains. Qingshui Town in Taichung Prefecture is at the mouth of the river. The basin area is 1,235.7 km² and the river is 140.2 km long, with 22 tributaries. This river system is the richest water resource in Taiwan.

The upper basin of the Tachia is designated as the Shei-pa National Park, famous for a beautiful gorge formed by erosion. It attracts some 200,000 tourists each year. The Qijiawanxi, one of the tributaries, is known throughout the world as a habitat of “*Oncorhynchus masou formosanum* (designated as a national treasure by the Republic of China),” which are distributed in the southernmost areas among the fish of Salmonidae. Various other types of fish live in the main course and branches to form a rich source of aquatic products. There are 12 villages, towns and cities in the basin, with slightly more than 650,000 inhabitants. The Kukuan hot spring (a sulfur spring; temperature: 48°C) in the middle basin of the main course is a representative spring in the middle part of Taiwan. Another area attraction is the Beifeng dislocation waterfall (about 8 m in height) created by the Taiwan (ChiChi) Earthquake in 1999. The Maan power plant is situated midway between this hot spring and the waterfall.



3. Main Impacts

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