

# Discussion on Design Conditions of Floating Pump Stations in Water Levels with Large Variations.

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## Objectives

The emerging urban water supply projects in Yunnan Province usually have the unique characteristics of long water delivery pipelines, high lift, large terrain fluctuations along the lines, and high requirements for water supply guarantee. Safe, economical and efficient water supply from the reservoir area has become an important task in water supply projects. Compared with the traditional water pump stations, the floating pump station has the characteristics of short construction period, low construction difficulty, high water intake efficiency, good water quality, safety and reliability, and less affected by water level changes. Taking the practical application of a floating pump station in a water supply project in Yunnan as an example, the design conditions of the floating pump station are mainly discussed from the following three aspects.

## Methods

First, measures such as optimizing the civil engineering design and coordinating the length of the three-stage rocker arm are used to avoid the extreme working conditions of the grounding of floating pump stations in water levels with large variations. second, proper lift and plane distance of cascade pump stations are used to balance the layout of electrical equipment, and reduce the size of floating pump stations; third, shore anchor piers are increased and underwater Hall's anchors are reduced to ensure the safety and stability of floating pump stations.

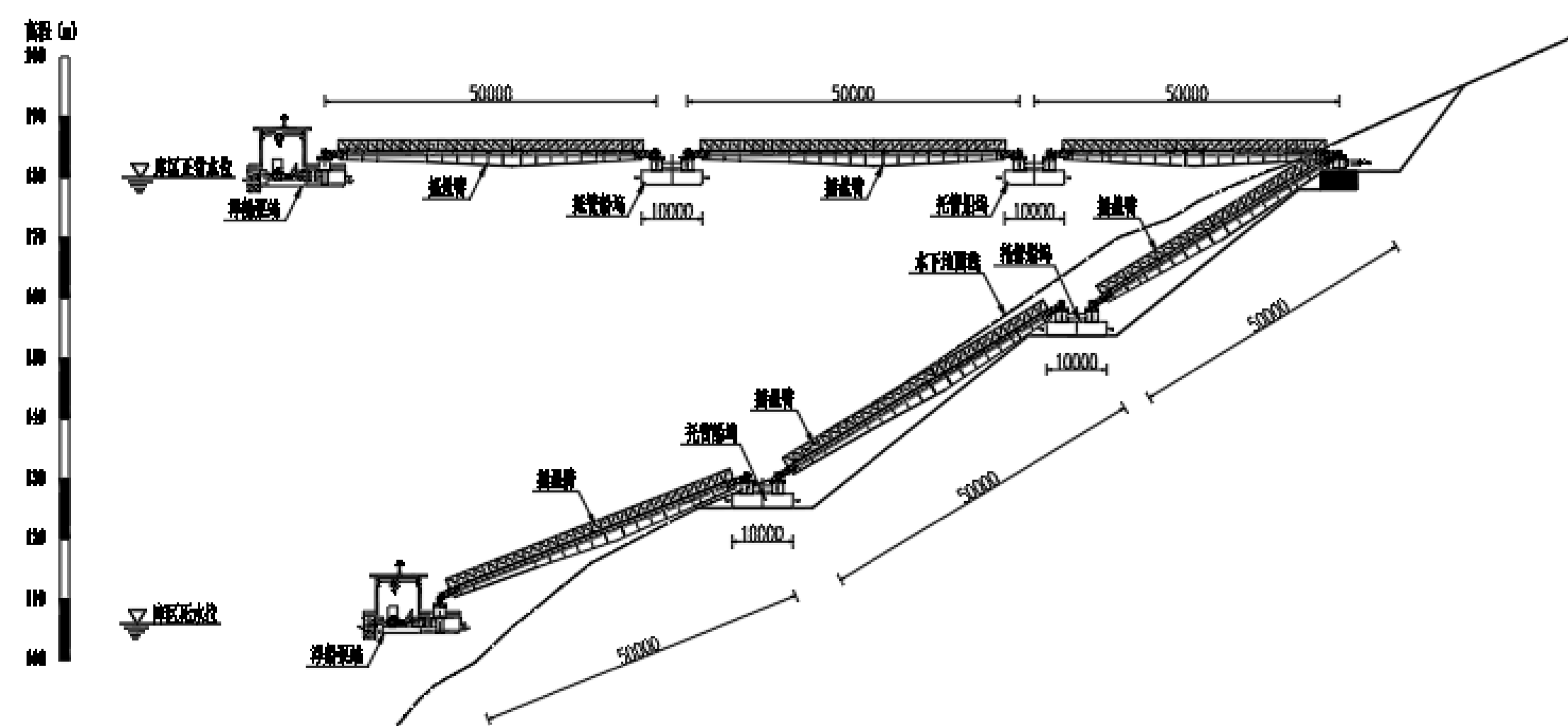


Figure 1. Cross section schematic diagram of floating boat pump station



Figure 3. Aerial view of floating boat pump station

## Results

The floating boat pump station of this project is feasible in terms of technology and practical operation, with great flexibility and adaptability. There is no complex underwater building structure constructed, which has the characteristics of short construction period, environmentally friendly, and convenient operation and management.

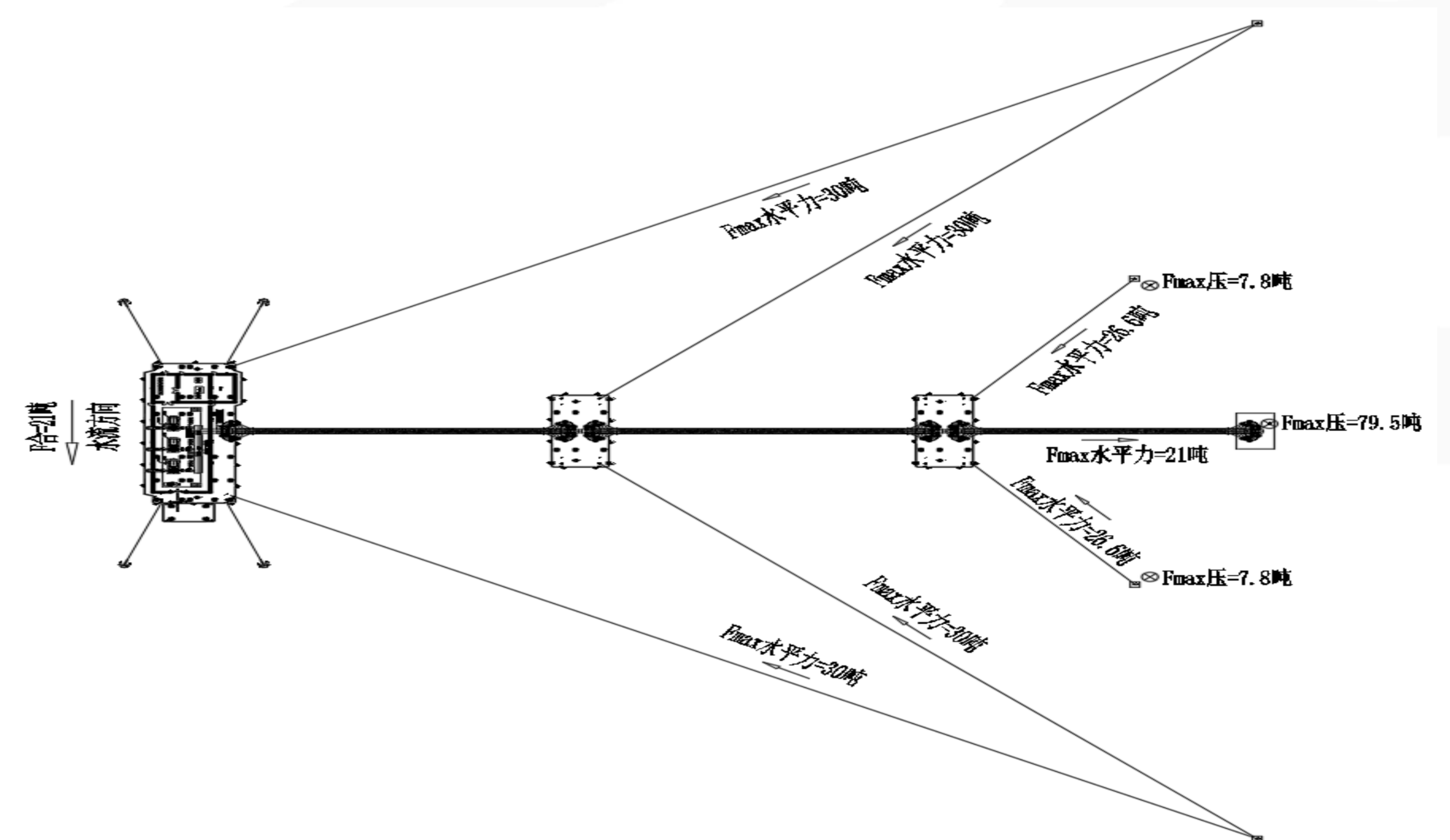


Figure 2. Schematic diagram of anchor pier stress in floating boat pump station

## Conclusions

Yunnan Province is rich in water resources, but the spatiotemporal distribution is extremely uneven. Seasonal and regional water scarcity is severe, which has become a bottleneck constraint for the construction of ecological civilization and sustainable economic and social development in Yunnan. There is an increasing number of comprehensive water supply projects supported by major water source projects and supplemented by comprehensive utilization of water resources in hydropower stations and water system connectivity projects. Safe, economical, and efficient water intake from water source engineering has become an important task in water supply engineering. The implementation of this project provides reference and reference for the design conditions of similar large amplitude water level floating boat pump stations.