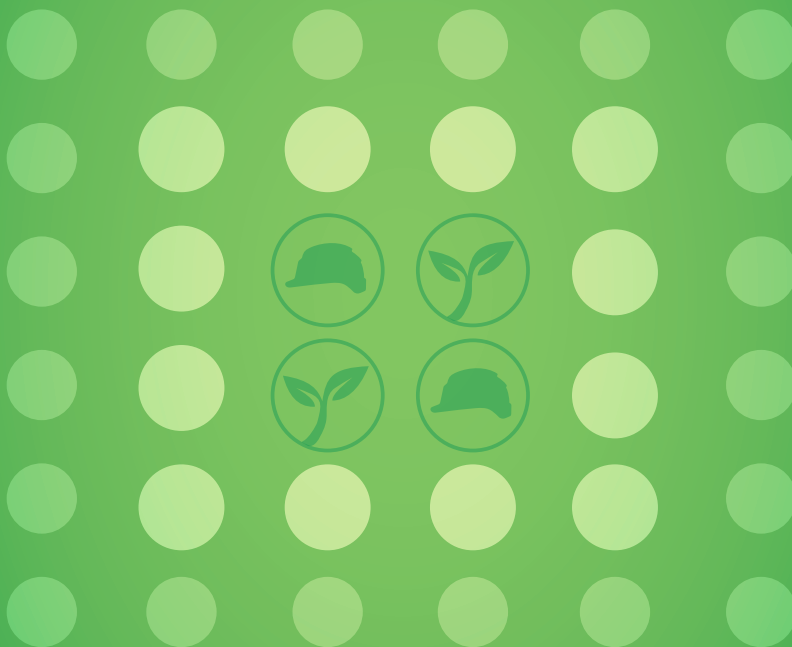


DAM SAFETY

Hydropower Projects in the Upstream Ayeyawady River Basin



Upstream Ayeyawady Confluence Basin Hydropower Co., Ltd.



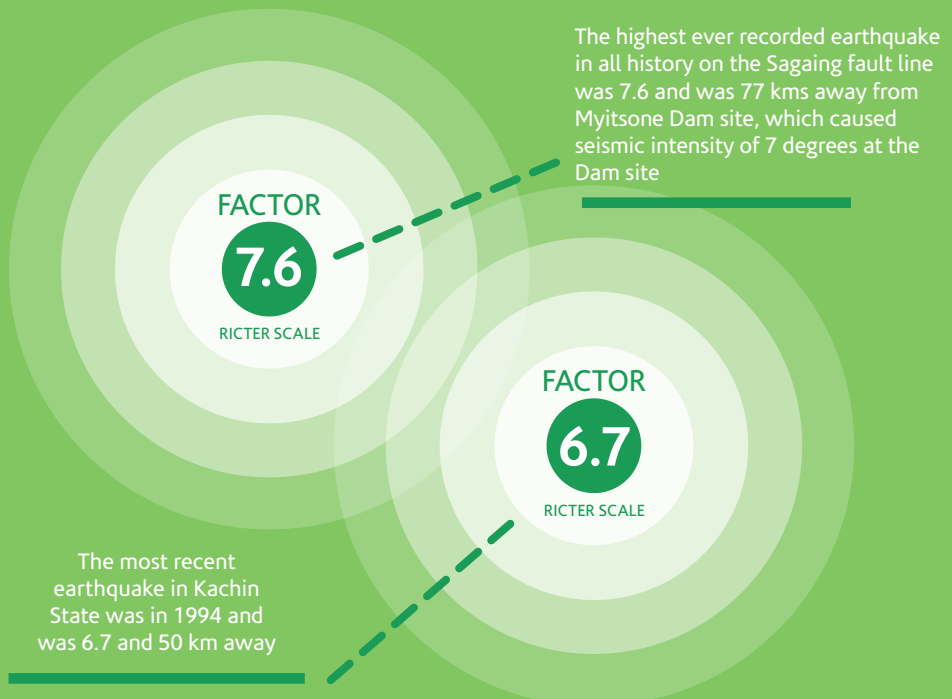


Safety first

Safety is our top priority. Upstream Ayeyawady Confluence Basin Hydropower Co., Ltd. (ACHC) not only adheres to standards set by the International Commission on Large Dams but has adopted additional measures to ensure that the hydropower projects are even able to withstand major earthquakes, if they occur.



Myitsone Dam can withstand an earthquake of seismic intensity of 9 degrees





Safety first

ACHC attaches great importance to the seismic safety of our hydropower projects. We adopt construction and maintenance techniques that are tried and tested around the world. Our dams are designed to withstand an earthquake of seismic intensity of 9 degrees – an extremely severe seismic activity far beyond what Myanmar has ever experienced in its history.

Understanding seismic risks in the region

We have conducted extensive research on tectonic stability and seismic risks in the upstream Ayeyawady region, especially for the proposed site of the Myitsone Dam. Since 2007, we have worked with several authoritative organisations to evaluate seismic risks of our hydropower projects. The research was aided by advanced technologies such as high-resolution satellite imaging, field investigations on structural landforms, field measurements and sample testing.

Results of the research were considered in the feasibility report for the Myitsone Dam's earthquake-resistance design. Research and surveys conducted by seismology experts concluded that there is no active fault line within the 25-kilometre radius of the proposed site. When designing

the Myitsone Dam, a minimum setback distance of 25 kilometres from a fault line was adopted according to international standards.

The Sagaing Fault Line, the most well-known active fault line in Myanmar, lies 77 kilometres away from the Myitsone Dam. Based on historical records of the tectonic movement of the Sagaing Fault Line, the most severe earthquake registered was 7.6 on the Richter scale, which caused seismic intensity of 7 degrees at the site of Myitsone HPP, and the Dam is designed to resist seismic intensity of 9 degrees, meeting the highest standard specified by the ICOLD. The most recent earthquake happened in January 1994 in southern Kachin State, approximately 50 kilometres away from Myitsone, was 6.7 on the Richter scale, far below the dam's design. In short, earthquakes in the Kachin State are relatively moderate and when they do happen, the hydropower projects are designed to withstand them.



Our commitment to safety

In addition to meeting the highest standard specified by the International Commission on Large Dams, the design of the Myitsone Dam adopts additional safety measures including a low slope ratio and a body filled with hard rocks that will form a thick and stable structure.

In order to further improve the overall seismic resistance of the dam, a range of measures such as reinforced concrete-grid slope protection, increasing reinforcement ratio of the surface slab and flexible joints on the body of the dam were adopted.

The selection of the dam crest elevation also takes into account various situations caused by flooding to avoid water rising over the top of the dam. In case of emergency, the Myitsone Dam could discharge water through 23 outlets which would rapidly reduce water level in the reservoir.

We are also setting up an advanced around-the-clock monitoring system. 700 safety monitoring equipment will be installed in the body of the dam that will provide early warning to the upstream Ayeyawady confluence basin.

These safety measures ensure that our dams will remain sturdy in an event of an earthquake.

Independent evaluation of ACHC hydropower projects

Assessment of seismic risks for our hydropower projects were conducted by experts drawn from renowned institutions from Myanmar and China. More than a hundred geology and dam safety experts were consulted to ensure the safety and reliability of the hydropower projects. Seismic simulation models were created in full compliance with the standards and regulations of both countries. Field trips were conducted to ensure that experts have access to accurate and recent data for their evaluation. A series of consultation sessions were organised to review the feasibility study of our hydropower projects. Eleven of the world's top geological experts reviewed the report on regional tectonic stability of hydropower projects in the upstream Ayeyawady river basin.

Experts who participated in the research and consultations concurred unanimously that the hydropower projects are located in safe zones away from tectonic fault lines. The entire research and evaluation process was conducted in full compliance with the strictest standards and was open and transparent throughout.

The Myitsone dam has 700 safety monitoring equipment embedded within it







Flood control safety

ACHC's hydropower projects are green technology that do not harm the environment nor create pollution. But as is essential to protect people's life and property, they must also be safe and capable of dealing with extreme flood that may happen in the future. ACHC has committed itself to honour and abide by stringent standards in ensuring that this remains the case.

Improved hydrological monitoring and early warning systems

Because of the importance of hydrological monitoring and early warning systems, ACHC had, upon the approval by the Government of Myanmar, begun to set up stations to collect hydrological data including flow, sediment concentration, and meteorological data including precipitation, evaporation, wind speed and velocity of the upstream Ayeyawady river basin since 2007, and shared and communicated with relevant departments of the Government of Myanmar. ACHC plans to construct hydrological stations, gauging stations and rainfall stations with a total number of 60, and 6 hydrological stations, 4 gauging stations and 23 rainfall stations have been built up to now. It is planned to build a hydrological station network that covers the entire river basin in the future.

The hydrological station network for river basin can monitor river health conditions and forecast flood accurately, thus to serve for hydropower construction and operation, and industrial and agricultural production. The discharge of Myitsone takes up about one third of the discharge of Ayeyawady River into the sea, and hydrological work for upstream Ayeyawady river basin will play a fundamental role in the planning for flood control for the whole Ayeyawady River.



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The Myitsone Dam adopts the highest standard for flood control in international hydropower industry, and the dam is designed to resist the 1,000-year return flood (with peak discharge of 51,000m³/s), and checked by the 10,000-year return flood (with peak discharge of 59,800m³/s) plus a margin of 15% (with peak discharge of 68,800m³/s); thus flood control capacity of the Myitsone dam far surpasses the biggest flood recorded in the history (36,100m³/s).

Myitsone Dam has maximum dam height of only 139.5m and crest length of 1,310m; 23 flood discharge outlets set for dam body (12 surface flood discharge outlets and 11 intermediate flood discharge outlets) fully guarantees flood discharge capacity of the dam; for the selection of the dam crest elevation, the wave run-up, water level rise by wind, added height for safety, seismic surge wave, additional seismic subsidence and other factors under different flood conditions have been taken into consideration and adequate safety margin is reserved to ensure no flood would overtop the dam crest.

Scientific and effective flood control measures

850 million m³ of flood control storage will be reserved after the completion of construction for Myitsone Hydropower Project, thus flood control capacity of Myitkyina and the downstream reaches of the river thereof will be improved significantly, and the safety of human lives and properties of downstream areas can be better protected; in normal operation, the flow of the lower reaches will be reduced by about 3.5% in rain season, and will be increased by about 16% in dry season, and downstream water volume can be increased by 4.5 billion m³ throughout the dry season, indicating positive effect for restricting downstream saltwater intrusion and improving downstream navigation, water supply and irrigation capacities.

In case of emergency, water level of reservoir can be lowered quickly through 23 outlets for flood control of Myitsone Dam, thus to ensure the safety of the dam and downstream area. When there is less water stored in the reservoir, a larger reservoir capacity for flood control will be available to deal with the large flood or earthquake and other natural disasters, so that the dam failure and other serious accidents will not occur. Besides, glacier melting, which is caused by greenhouse gas emissions and global warming, is a slow process, not an instantaneous action. Therefore, it will not cause sudden floods, and will not cause failure of Myitsone Dam either.



i) Ayeyawady's total average annual flow the same before and after dam construction



ii) Flow on lower reaches is reduced by 3.5% in the rainy season to reduce flooding



iii) Flow on lower reaches is increased by 16% in the dry season to prevent drying-up



Contact us

Upstream Ayeyawady Confluence
Basin Hydropower Co., Ltd.



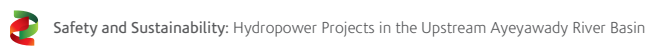
uachc@spicyn.com.cn



www.uachc.com



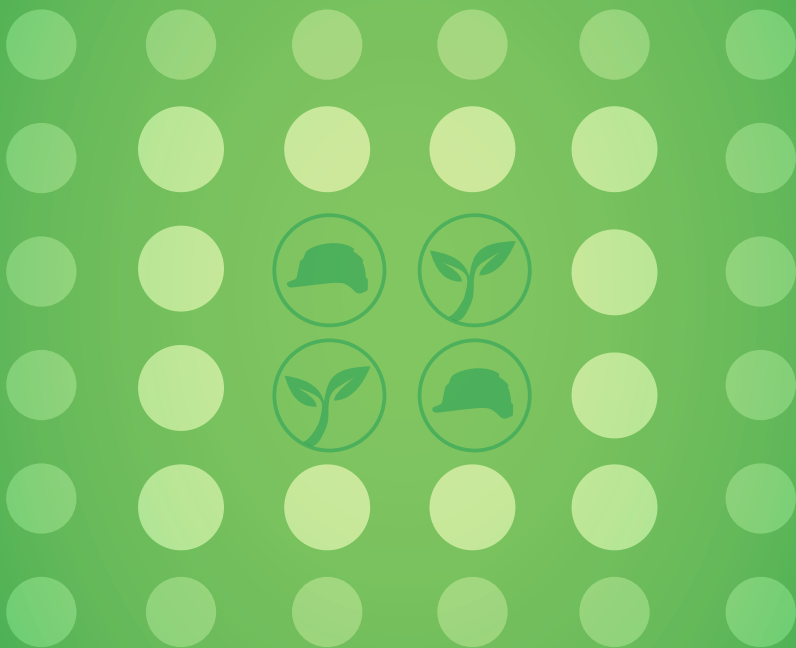
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