

Construction of Submersible bridges in rural areas in Myanmar



Department of Rural Road Development Ministry of Construction (Myanmar)
Japan Infrastructure Partners

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Construction of submersible bridges in rural areas in Myanmar was carried out in cooperation with Department of Rural Road Development, Ministry of Construction Myanmar, and Japan Infrastructure Partners.

Japan Infrastructure Partners

- Since **2006** as a **non-profit** organization
- **50** civil engineering experts
- Funded by donations and Japanese government grants



Bridge construction



Technology exchange



Road pavement



Japan Infrastructure Partners was established in 2006 as a non-profit organization with the aim of sustainable society.

About 50 civil engineering experts who have worked in overseas intergovernmental projects, are engaged in technology transfers and exchanges such as road pavements and bridge constructions in developing countries.

School children couldn't go to school because a flood had washed away a local bridge. (2015)



Field survey (2016)



Construction (2016-17)



First submersible bridge completed. (2017)

This project has started, when the vice president of Japan Infrastructure Partners Mr. Asakura visited Myanmar on his business trip in 2015. He happened to read a news article of school children who couldn't go to school because a flood had washed away a local bridge.

The following year, we dispatched a survey team and decided to rebuild the bridge with financial support from the Japanese Ministry of Foreign Affairs.

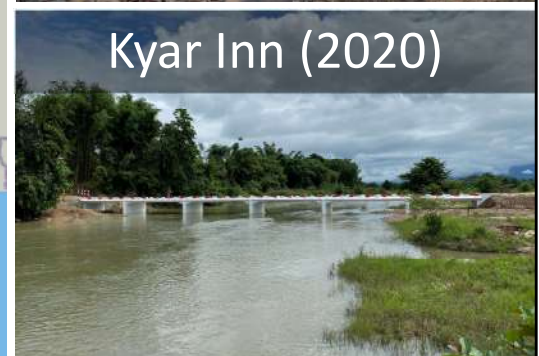
No.	Name of Bridge	Year	length
1	Yoma	2017	60m
2	Teza	2018	83m
3	Htain Linn	2018	66m
4	Thuriya	2018	66m
5	Thakin	2019	178m
6	Metta	2019	76m
7	Ohn war	2019	66m
8	Hong Tone	2020	56m
9	Shwe Thit Khauk	2020	66m
10	Shwe Khone Gyi	2020	122m
11	Kyar Inn	2020	56m
12	Moe Nine	2021	152m



Teza (2018)



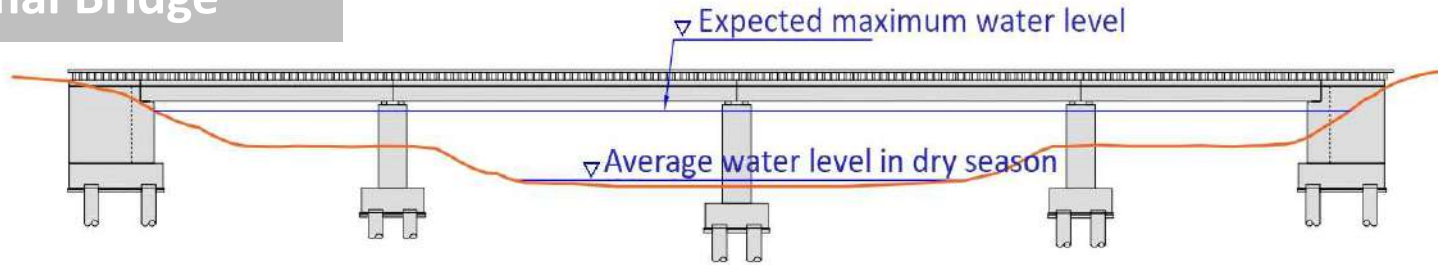
Thakin (2019)



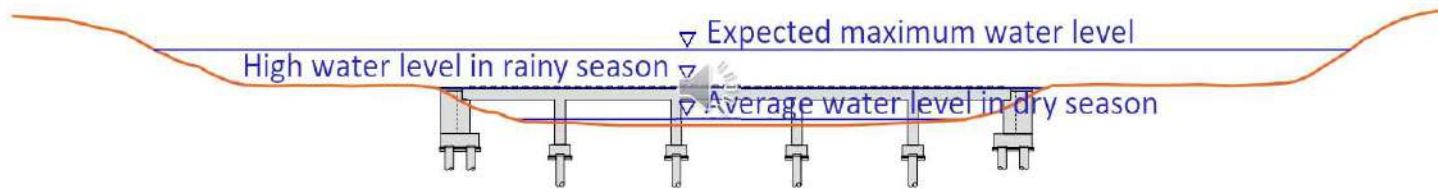
Kyar Inn (2020)

As it was quite successful and well received, since then we have built 12 submersible bridges in rural areas of Myanmar for the past five years.

Normal Bridge



Submersible Bridge

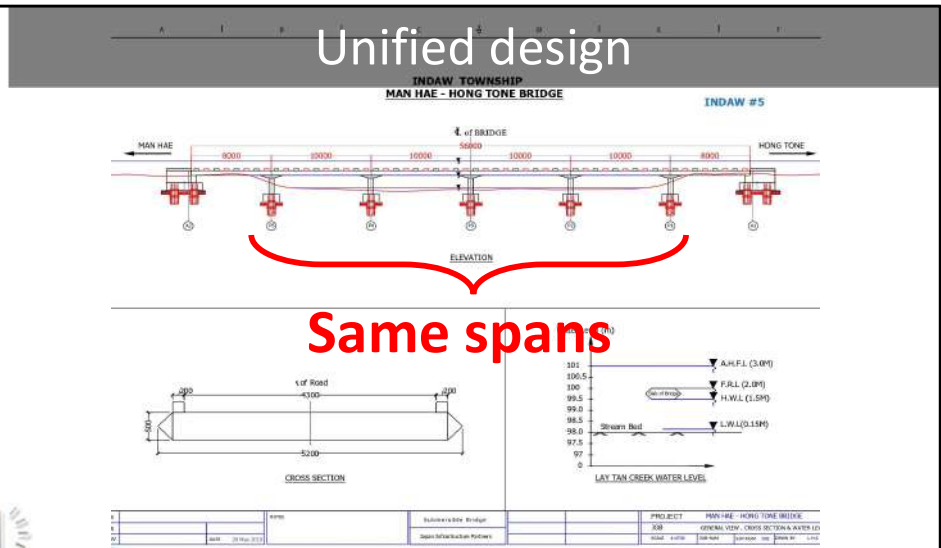
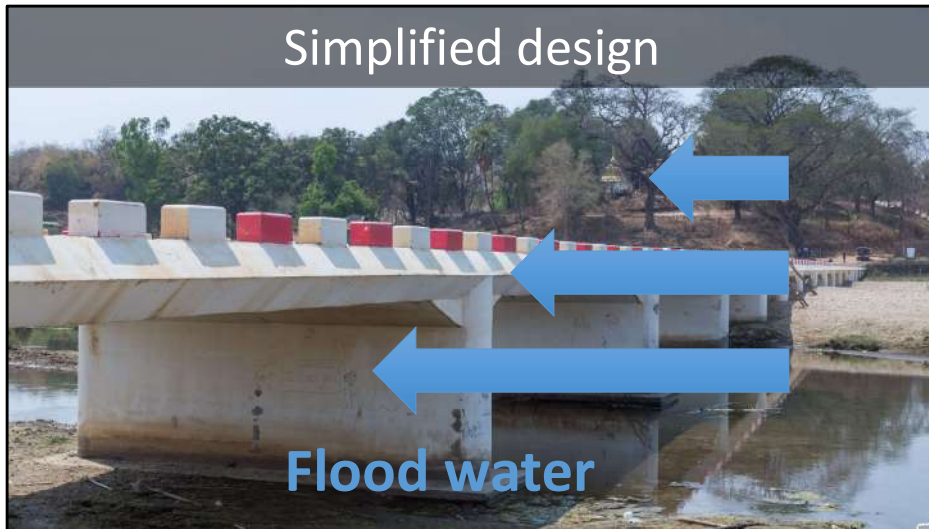


Shorter & Smaller
↓
Low cost & Easy to build
↓
Rapid road improvement



Normal bridges are built at a higher level, based on the maximum water level that is expected to occur every few decades, while submersible bridges are built at a lower level near the average water surface, which makes the bridge shorter and smaller.

Although a submersible bridge sinks under the water a few times a year when the river level rises due to flooding, its low cost and easy to build characteristics make it possible to improve the roads rapidly to countless rural villages suffering from poverty.



Here are the technical features of our submersible bridges.

- Bridge girders, handrails and shoes are omitted to reduce and resist the water pressure while submerging in floods.
- The spans and the thickness of road slabs and bridge piers are unified for easy construction and maintenance.
- All materials are easily procured in rural areas.
- Cast-in-place piling is applied to build the foundation firmly.
- Constructions are undertaken by local contractors and residents hired as temporary workers.

Our policy



Field survey and interviews with local people



Technical instruction for local engineers and students

Local engineers and residents plan, build and maintain the submersible bridges **by themselves**.

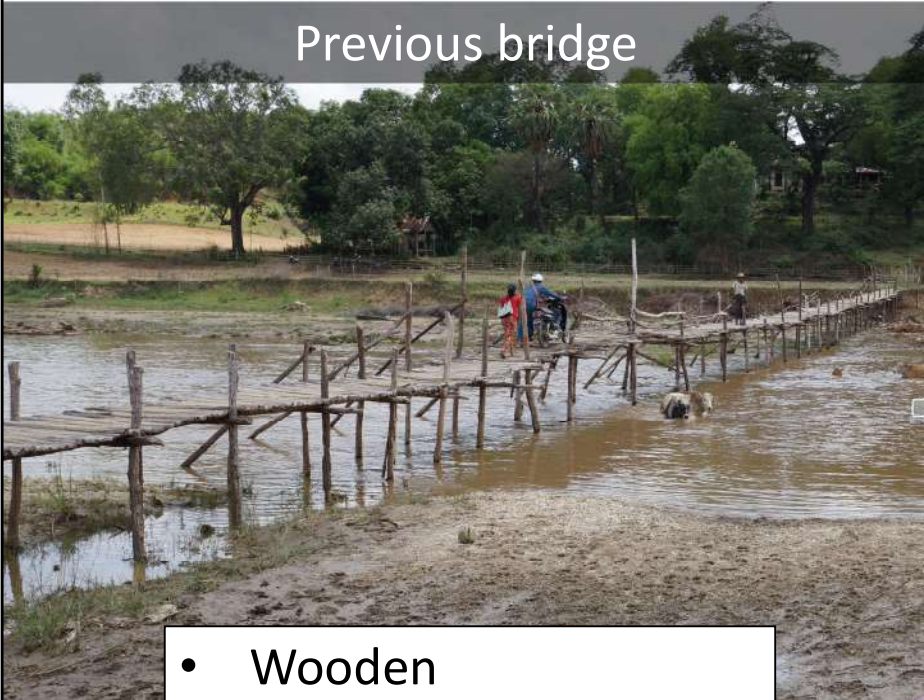
We have visited more than 100 candidate sites to do field surveys and interviews with local people.

At each construction site, we have held many workshops and given on-site instructions for local civil engineers and students responding to their requests.

It is our policy that local engineers and residents will be able to plan, build and maintain submersible bridges by themselves.

Comparison of the bridges

Previous bridge



- Wooden
- **People and bikes**
- **Only for dry season**
- **Rebuilt every year**

Submersible bridge



- Reinforced concrete
- **Cars, trucks and buses**
- **Throughout year**
- **Decades of lifetime**

Let's compare the previous bridge and the submersible bridge.

The previous bridge was made of wood.

It was so weak that only pedestrians and bikes pushed along by hands could go through.

It couldn't survive in the floods during the rainy season, so villagers used to work together to build a bridge at the cost of workforce for farming.

Now, the submersible bridge is made of concrete.

Not only pedestrians but also cars and large vehicles can go across the river throughout the year.

Never be worried about being washed away by floods, and decades of lifetime is guaranteed.



Before construction,

People were walking across rivers at the risk of drowning.

In the rainy season, residents were using boats. On riverbanks they were waiting for boats for a long time and loading heavy luggage every time.

Ox carts were also used when and where the water level wasn't high enough to use boats.

Many farmers had cows for agriculture because they couldn't use trucks and other agricultural machines to cross the river without bridges.



Farmers growing more crops



Shipping crops by a truck

After construction



Snake-bit person hospitalized in time



Regular bus service to the cities

After construction,

Farmers, as most residents are, can now grow more crops and ship them to the big cities using trucks throughout the year, which makes their lives wealthy and stable.

Regular bus service connecting the villages and cities has started, which improved their access to education, healthcare and job opportunities.

In the flood

Dry season



Rainy season



Gates are closed



Bridge is under the water



Debris are cleaned



Let's see how the submersible bridge works in a flood.

Water level rises in rainy seasons but most of the time the submersible bridges are passable.

Once a flood occurs, the bridge gates are closed while the bridge is sinking under the water.

After the flood, the residents work together to clean up debris caught on the bridge even before the water level has receded, which shows how important the bridge is to them.



Bridge opening ceremony



Lastly, we will show the scenes from the bridge opening ceremonies.
Please feel the enthusiastic welcome by the local people who have wanted a bridge for a long time.



Thank you for your kind attention.
We hope our submersible bridges will serve people for a long time to come.

Visit us at www.jip.or.jp

