Water Use and Comprehensive Development Project of Lake Biwa

According to the high-speed economic development in Japan after 1960s, demands of water in down-stream areas of Lake Biwa were increasing for industries and domestics year by year. In order to reply these demands, Japanese Government decided to develop Lake Biwa for a water resource.

In 1972, the special law for development of water resource at Lake Biwa was enacted as purposes to develop not only down-stream areas but also catchment areas of the lake.

Kyoto City located at neighboring portion of the lake had been the Japanese Capital for about one thousand years until about one hundred and forty years ago. Until then, Lake Biwa was the main transportation route for foodstuffs from northern production areas, named Hokuriku District, to Kyoto. The agricultural products to Kyoto from these areas were shipped at the northern end and landed at the southern end of the lake. And then, they had been transported by oxcarts crossing over the boundary pass, named Ousaka Mountain, between Shiga Area and Kyoto Area.

For reducing hard transportation works, a canal, named Kyoto Canal, was planned in 1881 for associating landing site with Kyoto, and construction work of the canal was started in 1886, completed in 1889.

When the canal was completed, Japan was just stepping into industrial development. In order to supply new power source, a commercial hydro-electric plant was constructed at the end of
the canal for the first time in Japan. By this fact, Kyoto is honored to be the birth-place of electric street car system in Japan.

After construction of Kyoto Canal, many water resource development projects have been implemented for downstream areas of Lake Biwa.

As you see on this screen, Lake Biwa is the largest water resource or natural reservoir of Yodo River System.

In the ancient time, such as until the late of 19th Century, the areas around the lake were frequently flooded by the lake water.

Because, as you can also see on this screen, the largest commercial city in Japan, Osaka, and Japanese symbolic capital, Kyoto, are located at the lower reaches of the lake, so, in that time, the national government, Edo Shogunate, had never permitted to dredge bed of the only one effluent mouth of the lake, Seta River, for protecting the both cities from flooding. The most severe flood in the history occurred in 1896. On the 13th September 1896, we had very heavy rain fall, and by tradition, it was rain fall like ropes for several hours.

We were able to find the traces of the inundation everywhere around the lake until 1960's. But now, all of such traces had been disappeared by town development after the high economic growth of 1960's.

The national government regarded this flooding as serious and started dredging work on Seta
River. One of the most important works of this work was the expansion of Seta River by removal of the protruding part of Dainichi Mountain to Seta River.

At the same time, the construction work of a weir gate, named Nango Araizeki, was set for control of water level of the lake. These works completed in 1905.

On the other hand, water-shortage causes several problems to residents.

Water-shortage occurs down of lake water-level. And Lake Biwa has been used for many purposes, such as:

1) For direct utilization,
   a) Municipal water supply
   b) Transportation for tourism
   c) Irrigation for paddy fields
   d) Fisheries
   e) Water sports and games such as swimming, yachting, boating and fishing
   f) Industrial water supply
   g) Aqua-culture etc.

2) For utilization of outflow from the lake,
   a) Municipal water supply
   b) Industrial water supply
   c) Power generation
   d) Irrigation etc.
Among these utilization, almost all of direct utilization are influenced by lake water level.

So, residents in Shiga Prefecture have been always interested in lake water-level as well as flood. When you will visit the Government Office of Shiga Prefecture on some day during this training course, you would be better to observe the display board at the front gate of the office building. You can see the daily record on the water level, water temperature and transparency of Lake Biwa. And also, you can see the display at the front lobby of Otsu Station, the front hall of Shiga Prefecture.

Operations of the Weir Gate, however, have never reflected desire of residents around the lake, because the response of the gate has been belonging to the national government for the reason why it is necessary to coordinate interests between up and down stream of Yodo River System.

The most typical work for utilization of the lake was construction of Kyoto Canal. The first purpose of the canal was transportation. In the ancient time, food production areas for Capital Kyoto were located at Hokuriku District extending at the northern area of Lake Biwa.

The agricultural products to Kyoto from these areas were shipped at the northern end and landed at the southern end of the lake.

The canal was planned in 1881 for associating landing site with Kyoto, and construction work
of the canal was started in 1886, completed in 1889.

When the canal was completed, Japan was just stepping into industrial development. In order to supply new power source, a commercial hydro-electric plant was constructed at the end of the canal for the first time in Japan.

By this fact, Kyoto is honored to be the birth-place of electric street car system in Japan.

The industrialization in Japan had been rapidly developed at the down-stream areas of the lake, such as Osaka and Kobe since the beginning of 20th Century.

And in accordance with the industrial development, industrial water demand had increased year by year.

In 1940, an integrated plan for control of Yodo River System, named The Full Plan, was decided in order to use water of Lake Biwa as water resource more effectively.

Since then, the problem on how to coordinate the conflicts between water resource development and control of water level of the lake has become the central point of policies for Lake Biwa management.

It was included in the Full Plan that water of Lake Biwa was used 145 cubic meters per second at Nango Weir Gate, and in the case of water-shortage, water level of the lake was able to be let drop to -1.8m from normal level for utilization as power-generation, municipal
and industrial water supply and irrigation.

(0-level = altitude 85.614m same height of the top of Osaka Castle Tower)

The construction work for improvement of river width and bed based on the Full Plan started in 1943 and finished in 1952.

Utilization of the lake water, however, was not agreed by people in Shiga Prefecture because there were no effective estimations about damages caused by down of water level.

According to the high-speed economic development after 1960s, demands of water in down-stream areas of Lake Biwa were increasing for industries and domestics year by year.

In order to reply these demands, Japanese Government decided to develop Lake Biwa for water resource again.

In 1972, the special law for development of water resource at Lake Biwa was enacted as purposes to develop not only down-stream areas but also catchment areas of the lake.

The characteristics of the law are;

1) More profitable subsidies to Shiga Prefecture than ones supported by national government under general rules to a certain local area for development,

2) Subsidies from down-stream areas to Shiga Prefecture for development as compensation to water level down of the lake, and

3) Conservation and improvement of environment in catchment areas of the lake.
The termination of this special law was originally 1981 fiscal year, but by the reason of oil-shock occurred in 1973 and social demand for more relevant measures on conservation, it was once prolonged until 1991 fiscal year, and again prolonged to 1996 fiscal year, because all of the projects based on the law had not yet completed.

This figure shows the structures of the projects promoted on the law.

The problems that this project caused to the lake environment were lack of ecological view points regarding to promote the construction works at coastal areas.

The environment sector in the Government of Shiga Prefecture recommended to construction sectors on 6 points;

1) Estimate all of pollutants resulted by construction works, such as not only treatable ones but also untreatable ones,

2) Estimate exactly influences caused by such pollutants to the lake,

3) Organize systems for investigating influences occurred during construction works,

4) Develop clean technologies on construction works,

5) Develop methods on how to assess economic benefits between profits gained by construction works and damages caused by pollutants, and

6) Develop measurable bio-indicators on water quality.

In order to reply to these recommendations, the Governor of Shiga Prefecture sat up a personnel post in the construction sector in the office, and the construction sector provided
four types of guidance for environmentally sound promotion of public construction works.

These types are:

1) "The Basic Environmental Considerations for Promoting Public Construction Works",
2) "The Environmental Considerations for Promoting River-Improvement Works",
3) "The Environmental Considerations for Promoting Road Construction Works",
4) "The Environmental Considerations for Urban Area Development Works".

And on January in 1994, Ministry of Construction in Japan presented the same guidelines of construction works as general principle in Japan.