The Building Investigation Reprot of Lan-Yan Railway

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Abstract. The Lan-Yan Railway is the first railway line built in Shandong Province under the “First Five-Year Plan” period, which embodies more “national confidence” of the people's Republic of China. This paper focuses on the damage of building sites along the railway through field investigation, analyzed the present situation and the value of Lan-Yan railway, and pointed out that it is of great significance to protect the building sites along the railway line. It is hoped that the completion of the report can provide some reference for the protection of the architectural heritage along the railway in Shandong Province.

1. Overview of Lan-Yan Railway
Lan-Yan Railway is the rail way built within the First Five-Year Plan of Shandong Province after the founding of New China, and it is also the first trunk railway connected to the outside in the history of Yantai. The line starts from Lancun Station of Jiaoji railway and ends at Yantai urban area (figure 1). By the end of 1985, it had a total length of 183.87 kilometers, a total of 18 stations and 131 bridges, among which the Qingshui River Bridge and the Clam River Bridge were both 200 meters. The terrain of the area passed by the Lan-Yan Railway can be divided into three types. First, the area between Lancun and Laiyang station is mostly alluvial plain with relatively flat terrain, and the soil is dominated by sand and clay. Second, from Laiyang to Taocun: The terrain is relatively complex, and the geological structure is mainly interbedded sandstone and shale. Third, from Taocun to Yantai, Most lots have terraces, with marble crystalline limestone among the exposed rocks. The highest point of the line is between Haiyang and Changshabao Station, with an altitude of 147.84 meters. The lowest point is in Yantai Station, with an altitude of 3.04 meters.
1.1. Historical evolution

In August 1952, the third survey and design team of the former Ministry of Railways Design Bureau began survey and design and the former Fifth Engineering Bureau of the Ministry of Railways was responsible for the construction of the project. In October 1954, the Fifth Engineering Bureau of the Ministry of Railways was disbanded and the Infrastructure Construction Division of Jinan Railway Bureau was responsible for the project. On January 1, 1956, it was completed and opened to traffic. On December 29, 2001, Lan-Yan Railway double-track was opened for operation. On April 2, 2009, the electrification transformation of Lan-Yan Railway started construction. On August 26, 2010, the electrification transformation of the entire line was officially completed. The first freight train pulled by electric locomotive arrived at Yantai Station the next day, marking that Lan-Yan Railway has entered the electrification era.

1.2. Analysis of station status along the line

By the end of 1985, there were 18 stations on Lan-Yan Railway (figure 2), including 1 first-class station, 1 second-class station, 2 third-class stations and 14 fourth-class stations. Five stations -- Tuwan, Shangtuan, Shanqianqian, Changshanpu and Chenjiatuan -- were successively canceled after the full double-track railway line was opened in 2001, while the Huili station was also abandoned in the electrification transformation of Lan-Yan Line in 2009 (figure 3). At present, the maximum distance between stations on the whole line is 32.757 kilometers (Laiyang-Haiyang) and the minimum distance between stations is 5.878 kilometers (Zhuji-Yantai) (table 1, table 2). The following is an analysis and introduction to the current status of the 18 stations on Lan-Yan Line (figure 3).
Table 1. The odometer of Lan-Yan Railway (Original).

| Location           | Distance (km) |
|--------------------|---------------|
| Tianjin            | 1083          |
| Jining             | 2385          |
| Shangdun           | 372           |
| Guanqianxiang      | 4626          |
| Lanxi              | 547           |
| Magezhuang         | 6674          |
| Liaoyang           | 7706          |
| Shangqianxiang     | 9270          |
| Hangzhou           | 10988         |
| Changshiazhou      | 11679         |
| Taicang           | 12917         |
| Jiangsu           | 13865         |
| Huai               | 15129         |
| Weifang           | 15858         |
| Fushan            | 16688         |
| Zhaoji             | 17799         |
| Yantai            | 18387         |

Table 2. The odometer of Lan-Yan Railway (Now).

| Location           | Distance (km) |
|--------------------|---------------|
| Tianjin            | 1083          |
| Jining             | 2385          |
| Shangdun           | 372           |
| Guanqianxiang      | 4626          |
| Lanxi              | 547           |
| Magezhuang         | 6674          |
| Liaoyang           | 7706          |
| Shangqianxiang     | 9270          |
| Hangzhou           | 10988         |
| Changshiazhou      | 11679         |
| Taicang           | 12917         |
| Jiangsu           | 13865         |
| Huai               | 15129         |
| Weifang           | 15858         |
| Fushan            | 16688         |
| Zhaoji             | 17799         |
| Yantai            | 18387         |

1.2.1. First-class stations. Lancun Station, located in Lancun Town, Jimo District, Qingdao City, Shandong Province, was built in 1901 as the first-class passenger and freight station, and now it is the second-class passenger and freight station. According to the Chinese provinces and municipalities classification document issued by the National Bureau of Statistics, the area of Lancun Station belongs to the township level and its geographical location is very advantageous. It is the intersection of Qingdao-Jinan Railway and Lan-Yan Railway, adjacent to Xinli Village in the east, Yong'an Road in the west, Zhoujiawuzi Village in the south, and Guojiazhuang Village in the north. The Jiqing Expressway passes through the border and has entrances and exits. Moreover, the town has the largest railway logistics hub and modern integrated intelligent logistics park in the peninsula.

The building of Lancun Station is divided into three parts, the waiting room and ticket office are in the hall, and the north exit of Blue Village Station is on the west, the east side is the baggage consignment office and cargo express office of Lancun Station. There are water towers, electricity guesthouses, railway hotels and other buildings in its surroundings.

1.2.2. Second-class stations. Yantai Station, located in Zhifu District, Yantai City Center, Shandong Province, was built in 1958. In 1991, the station was renovated. In 2009, the old station was dismantled and the new station was put into use. Yantai Station was first built as a second-class passenger and freight station and upgraded to a first-class passenger and freight station in 1988. The present Yantai Station is adjacent to Times Square and Liangyou Square in the south, Yantai port freight terminal and warehouse area in the north, the passenger terminal of Yantai International Port in the east, and Youth Road in the west. The district level to which the station belongs is county.

The new Yantai Station building covers an area of 48,828 square meters. The main part of the station building is mainly the second floor and partly the third floor. The passenger transport room of the station mainly includes ordinary waiting room, ticket hall, soft-seat waiting room, mother-child waiting room, commercial and office service room in the station. It is surrounded by buildings such as...
Haigang Logistics Building, Huitong Business Building, Yantai Entry-Exit Inspection and Quarantine Bureau.

1.2.3. Third-class stations. Laixi Station, located at the southeast corner of Wangcheng Street, Laixi City, Qingdao City, Shandong Province, is surrounded by villages or communities. It was built in 1955, rebuilt in 2014 and renamed as Laixi South Station in November 2020. It is now the third-class passenger and freight station and its regional level is township. The station is divided into three parts, from left to right are the exit, ticket hall and waiting room.

Laiyang Station, located in Jingshan Road, Laiyang City, Yantai City, Shandong Province, was built in 1955 and rebuilt on the original site in 2014. Laiyang Station was first built as a third-class passenger and freight station, and later upgraded to a second-class passenger and freight station. It is the intermediate station between Lan-Yan Railway and Qingdao-Rongcheng Intercity Railway. It is near Fengjiatuan Village in the east, Fushui South Road in the west and Jingshan Road in the north and its regional level is county. The complex building of new Laiyang Station has a construction area of 8992.1 square meters. The station building is divided into three areas, namely the exit area, the lobby waiting area, and the ticketing area.

1.2.4. Fourth-class stations. Tuanwan Station is located about 2000 meters southwest of Tuanwan Village, Qiji Town, Jimo District, Qingdao City, Shandong Province. The station is surrounded by fields. It was built in 1955 as a fourth-class freight station and its regional level is village. Although the station was revoked around 2000, the station buildings were not destroyed. The buildings are all damaged now.

Jiangjiapo Station is located about 2500 meters southwest of Jiangjiapo Village, Duanbolan Town, Jimo Section, Qingdao City, Shandong Province. It was built in 1955 and the buildings are well preserved. Now it only handles train receiving and dispatching services. It is a fourth-class station and the regional level of village. The station buildings are all one-story buildings with sloping roofs.

Shantuan Station is located about 2000 meters northeast of Shantuan Village, Xagezhuang Town, Laixi City, Qingdao City, Shandong Province. The station is surrounded by fields. It was built in 1955 and is a fourth-class freight station. It has now been canceled and the area belongs to the village. The buildings are damaged.

Guojiazhuang Station is located about 300 meters southwest of Guojiazhuang Village, Laixi City, Qingdao City, Shandong Province. It was built in 1955. It is a fourth-class freight station and the area belongs to the village. Now it has been closed down. Judging from the remaining building conditions, the buildings all have varying degrees of damage. There are Laixi Grain Storage and Transportation Station, Water Tower, and Guojiazhuang Line Workshop of Laixi Line Workshop of Qingdao Public Works Section and other buildings.

Magezhuang Station is located in Damagezhuang Village, Luge Town, Laiyang City, Yantai City, Shandong Province. It is surrounded by large fields. It was built in 1955 and is now a fourth-class freight station. The area where the station is located belongs to the village. The station building is relatively new overall. There are five-pointed star reliefs on the gables of several buildings. There are buildings such as the old station site and family houses in the surrounding area.

Shanqiandian Station is located in the southwest of Shanqiandian Village, Shanqiandian Town, Laiyang City, Yantai City, Shandong Province. It is surrounded by large fields. It was built in 1955 and is now a fourth-class freight station. The construction of the station building is seriously dilapidated, surrounded by weeds. There are buildings for family members, road protection office, power distribution room, etc. in the surrounding area.

Haiyang Station is located in the southeast of Xujiaadian Town Government, Haiyang City, Yantai City, Shandong Province. It is backed by a large number of terraced fields. It was built in 1955 and was renamed Xujiaadian Station in 2018. It is the fourth-class passenger and freight station. The area of Haiyang Station belongs to the township. The station building is a two-story building, which is mainly
Changshabao Station is located in the southwest of Changshabao Village, Haiyang City, Shandong Province, was built in 1955. It is a fourth-class freight station and the area of station belongs to the village. It has been canceled and the station buildings have been destroyed, leaving only some ruined rubble.

Taocun Station is located in the northeast of Taocun Town, Qixia City, Yantai City, Shandong Province. It is surrounded by residential buildings. It was built in 1955 and is the fourth-class passenger and freight station. It is now the third-class passenger and freight station. It is the connection station of Taocun-Weihai Railway and Lan-Yan Railway in Taocun Station. The area of station belongs to the township. The station building is mainly divided into three parts: the waiting room, the ticket hall and the exit. There are the remains of the old station building of Chenjiatuan Station, water towers, hotels and other buildings in the surrounding area.

Chenjiatuan Station is located in Chenjiatuan Village, Taocun Town, Qixia City, Yantai City, Shandong Province. It was built in 1955 and is a fourth-class freight station. It has been canceled and the area of station belongs to the village. The exterior and interior of the station yard are now covered with weeds. The station building is a heavily damaged one-story flat-roofed building.

Huili Station is located in the southwest of Huili Town, Fushan District, Yantai City, Shandong Province. It is surrounded by the station buildings. The G204 expressway in the north of the station runs through the area, and the other three sides are terraced fields. It was built in 1955 and is the fourth-class freight transportation. The station has now been canceled and its regional level is township. The station building is abandoned now. In the surrounding area, there are buildings such as the Huili Line Work Area, the Huili Machinery and Chemical Team and the Grain Management Office.

Wangyuan Station is located about 2,000 meters east of Wangyuan Village, Huili Town, Fushan District, Yantai City, Shandong Province. It is backed by the G204 highway and the north is the field. It was built in 1955 and is a fourth-class freight station. The area of station belongs to the village. The station building was rebuilt and rebuilt later. There are Wangyuan Line Work Area, Wangyuan police area and other buildings in the surrounding area.

Fushan Station is located about 2000 meters north of Chutang Village, Fushan District, Yantai City, Shandong Province, is adjacent to Jitie Yantai Logistics Park in the east. It was built in 1955 as the fourth-class freight station, but now is the third-class freight station and the area of station belongs to the village. The station is a one-story flat-roofed building, which is relatively new as a whole and has a cargo operation room. It is surrounded by buildings such as Fushan Line Work Area, Water Tower, Jinan Railway Yantai Logistics Park.

Zhuji Station is located in Zhifu District, Yantai City, Shandong Province. It was built in 1955 as the fourth-class freight station, but now is the third-class freight station. It is the junction station of the Lan-Yan Railway and the Longyan Railway. It is also the starting point of the Yantai-Dalian Railway Ferry (Bohai Railway Ferry). The area of station belongs to the county. The station building is a one-story flat-roofed building with a canopy. There are boiler rooms, station public security, warehouses and the remains of old station buildings in the surrounding area.

1.2.5. Summary. Lan-Yan Railway has successively canceled 7 stations along the route since 1985. Among the 7 canceled stations, the area of Shanqiandian Station and Huili Station belong to the township level, while the remaining 5 stations area are subordinate to village level (figure 4). According to the investigation and analysis, there are roughly three reasons for the cancellation of the station. First, the upgrade and reconstruction of Lan-Yan Railway and the opening of double track, the railway capacity is increasing, which necessitates the significant cancellation of stops. Second, the extensive construction of roads in rural areas and the increase of high-speed sections have made transportation more and more convenient, so that car travel or transportation is more convenient than the train. Third, on the basis of the second point, the passenger and freight traffic has decreased.

In addition, the architectural functions of the 11 stations currently in operation are also different
In a broad sense, the main buildings of the stations (Jiangjiapo Station, Magezhuang Station, Wangyuan Station, Fushan Station, Zhuji Station) that only handle freight are freight dispatch rooms, offices, duty rooms, and warehouses. Therefore, the function of this type of station is to meet the delivery of goods. And the main buildings of the stations (Lancun Station, Laixi Station (now Laixi South Station), Laiyang Station, Haiyang Station (now Xujiadian Station), Taocun Station, Yantai Station) that handle both freight and passenger transportation are the passenger station building (ticket hall, waiting room, luggage room), office freight station building (freight yard, warehouse, duty room). In addition to meeting the requirements for the arrival and delivery of goods, it also needs to meet the needs of local passengers and the regional level of the stations for passenger transportation is at the township and above.

Figure 4. Grade map of the area to which each station of the Lanyan Railway belongs.  
Figure 5. Business Distribution Map of Lanyan Railway Stations.

2. The value of the Lan-Yan Railway

The Lan-Yan Railway was built in the early period of the founding of the People's Republic of China, but the Lan-Yan Railway built during this period had great historical, social and economic value.

2.1. Historical Value

After the founding of the People's Republic of China, the Korean War broke out (1950-1953). The Korean War broke out (1950-1953). The Jiaodong Peninsula and the Korean Peninsula face each other across the sea, with a short straight line distance. This shows that the Jiaodong Peninsula, especially the northern port city of Yantai plays an important role in national defense. At this time, there is an urgent need to build two railways, including the Lan-Yan Railway, to support the Korean War and strengthen China's coastal defense forces in the Bohai Sea. During the first five-year plan period, the Korean War ended and the Soviet Union provided technical support and assistance to China. Therefore, the route design of the Lan-Yan Railway absorbed the experience of the Soviet Union during the Great Patriotic War and formed the thought that a decentralized layout of important targets for enemy air strikes during the war. Moreover, the national financial resources are limited, and the railway design standard is not high, which directly affects the scale and materials of each platform in this period.

2.2. Social value

During the construction period of the Lan-Yan Railway, it highly embodies the “national spirit” of the people of New China who are constantly striving for self-reliance and self-reliance. In the early stage of construction, all counties along the route set up headquarters to implement unified command and dispatch. And before the construction, the counties have carried out extensive mobilization to guide the cadres and the masses to fully understand the important role of the construction of the Lan-Yan Railway in national defense construction and economic development, call on the masses along the line to actively support railway construction. In more than a year, the construction tasks were completed in
accordance with the requirements of railway planning and design with quality and quantity.

2.3. Economic Value
With the completion and opening of the Blue Tobacco Railway, the combined sea and land transport between Jiaodong-Jinan and Tientsin-Pukow Railway and Yantai has been developed, forming the construction of a road network in Jiaodong Peninsula with railway as the backbone of transportation. In addition, the completion of the Lan-Yan Railway connects Yantai Port with the cities in Shandong Province, promotes the exchange of agricultural and sideline products and coastal aquatic resources along the line with other regions and the economic development of Yantai and even the entire Shandong region[4].

3. Conclusion
As a product of the first five-year plan, the Lanyan Railway has unique historical value, cultural value, social value and economic value[5]. It is the precious material and spiritual wealth during the construction period of the first five-year plan in my country. But due to the high-speed railway undertakings, the lack of awareness of protection of the masses, the ambiguity of the distribution of belongings and other issues[6], the buildings along the route are in a state of reconstruction, abandonment and even destruction. It is urgent to rescue and protect them. This survey evaluates the architectural heritage along the Lan-Yan Railway, hoping to provide a reference for the protection of the architectural heritage along the Lan-Yan Railway.

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