

# Analysis of General Exploration Status of Tidal Flats in Miaowan Town, Tongchuan City

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**Abstract:** The balance between occupation and compensation of cultivated land in Shaanxi Province is becoming more and more severe, and it is an urgent need to carry out land consolidation projects in a timely manner to ensure the healthy development of the province's economy and society and improve the living standards of rural residents. The tidal flat land improvement project in Miaowan Town, Tongchuan City is a channel tidal flat land project. It has good water resources and relatively flat terrain, and is suitable for further development as cultivated land. We carry out general survey of soil layer thickness. The results show that the local land levelness is poor, the fields are uneven, there is a lack of unified planning, and the thickness of the soil layer is uneven, and relevant improvement measures are proposed.

**Keywords:** Cultivated land occupation and supplement balance, Yangling, Tidal flat, General exploration.

## 1. Overview of the Study Area

In order to ensure the economic and social development of Shaanxi Province, and to ensure the construction of key provincial projects and major linear projects, the balance of arable land occupation and compensation in Shaanxi Province is becoming more and more severe[1]. The timely and appropriate development of land consolidation projects has become a key to ensuring the healthy development of the province's economy and society and improving the living standards of rural residents. urgent need[2-4].

Miaowan Town, Yaoqu Town, Shizhu Town and other areas in Tongchuan City have carried out land remediation projects. Through supporting agricultural infrastructure, high-standard irrigated land has been increased to solve the contradiction between supply and demand in Tongchuan City and even Shaanxi Province, and ensure that Shaanxi Province The implementation and development of key projects in Shaanxi Province will ensure the simultaneous advancement of ecological sustainable development and healthy economic development in Shaanxi Province.

The existing land remediation projects in Tongchuan City are mostly wasteland remediation projects in hilly areas, while the tidal flat land remediation project in Miaowan Town is a channel tidal flat project. Affected by river erosion, there are many gravel distribution in the area and uneven soil thickness. However, the project area is close to the Ju River and is located in a wide channel. It has good water resources and relatively flat terrain, which is suitable for further development into cultivated land to improve the utilization rate of land resources. In order to find out the basic situation of the area and find out the distribution law of soil layer thickness, we conducted research and carried out general exploration of soil layer thickness.

The project area is located in the northwest mountainous area of Miaowan Town, Yaozhou District, Tongchuan City. Miaowan Town is 45 km away from Yaozhou District, adjacent to Yaoqu Town in the east, Liulin in the south, Zhaojin Town in the west, and Miaowan Town in Malan

Township, Xunyi County in the north. The project area is between 108.721°-108.727° E and 35.182°-35.184°N.

## 2. Method

The general exploration of soil layer thickness in the project area is mainly carried out in accordance with the "Technical Specification for General Exploration of Land Engineering" (DB61/T 1322-2020) [5]. The profile is generally surveyed, and the contour map of soil layer thickness distribution in the project area is drawn using Surfer 8.0.

## 3. Results

### 3.1. Problems in the Project Area

Through the investigation and survey of the project area, the specific soil structure and land use status in the area have been preliminarily clarified. The project area is a tidal flat near the Juhe River. The surface layer is loess and alluvial-proluvial silt, and the cultivability is good. However, the soil layer in some areas is thin and the gravel is exposed. The lower layer is a gravel layer, which has poor water retention and is difficult to cultivate(Figure1).



Figure 1. Soil profile in the project area

The terrain in the area gradually decreases from the upstream to the downstream (from west to east), and the height difference is about 10 m. There are soil pits left by sand

mining in the western part of the project area (Figure 2). The eastern boundary area of the district is barren and overgrown with weeds due to the thin soil layer. After on-site investigation and inquiries, some tidal flats in the area have

been cultivated after being covered with soil spontaneously by local residents, but there are still a lot of gravel in the fields, the land level is poor, the fields are uneven, and there is a lack of unified planning. Not very motivated.



Figure 2. Dirt pits in the project area

### 3.2. General Exploration Point Layout and Soil Thickness Distribution

The on-site general survey investigation is mainly based on the topographic and geomorphological conditions of the project area. The checkerboard method is used to conduct general surveys. According to the distance from the riverbed, there are generally 3 rows of general survey points in the east-

west direction, and 11 general survey points along the upstream to downstream direction of the channel. The distance between each point is between 20-40 m. For areas with large undulations, the area is properly densified, and a total of 33 points are arranged, as shown in Figure 3. The thickness determination standard is: when the soil drill reaches the gravel layer, the depth of the soil drill is recorded as the soil layer thickness.



Figure 3. Layout of general detection points for soil layer thickness

According to the general survey results of soil layer thickness, a contour map of soil layer thickness distribution in the project area is drawn, as shown in Figure 4. It can be seen that the closer to the river bed, the thinner the soil layer, the thickness of the soil layer in the area closest to the river bed is between 30-90 cm, and the farther away from the river bed, the thicker the soil layer, and the thickness is between 80-190 cm; On the whole, the thickness of the soil layer in the

project area gradually decreases from the upstream to the downstream direction of the channel, from 90-190 cm in the upstream (300 cm in some areas) to 30-80 cm in the downstream. To sum up, the thickness of soil layers in the project area is unevenly distributed, but during the remediation process, the remediation needs can be basically met through the allocation of earthwork in the area, and the purpose of normal growth of crops can be achieved.



Figure 4. Contour distribution map of soil layer thickness

## 4. Conclusion

(1) There are earth pits left by sand mining in the western part of the project area, and the eastern boundary area is barren and overgrown with weeds. These two areas need to be considered in planning and design. For the location of the soil pit, it is suggested that the lower layer should be leveled by burying sand and gravel, and then the soil source should be deployed in the thicker area of the northern soil layer to cover the soil, and the thickness of the soil cover should not be less than 30 cm.

(2) The plots in the project area are scattered, the flatness is poor, and there is a height difference of about 10 m between the upstream and downstream. The planning and design should pay attention to unified planning. It is recommended to set up terraces from west to east according to the terrain to meet the requirements of mechanical farming. At the same time, considering the later drainage problem in the field, a certain slope is set inside each field from north to south. A drainage ditch is designed on one side of Xichuan River (a tributary of Ju River) to facilitate drainage between fields[6].

(3) The thickness of the soil layer in the project area is uneven, and the thickness of the soil layer varies between 30-190 cm (300 cm in some areas). According to the results of the general survey, during the renovation of the project area, the internal earthwork allocation in the project area should be carried out according to the contour map of soil layer thickness distribution, so as to reduce the amount of foreign soil transported as much as possible and reduce the engineering cost. At the same time, when deploying earthwork[7], care should be taken to avoid excavating the gravel layer to ensure that the soil gravel content in the upper ploughing layer is less, which is beneficial to agricultural cultivation.

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