Research on Work-for-Relief in Overhead Transmission Line Projects

-- A Case Study of a UHV Line Project

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Abstract

"Work-for-relief" is an important policy to promote local employment and income increase of the masses and improve their labor skills. It can provide large-scale employment opportunities for the masses, especially migrant workers and people lifted out of poverty. It is an important way to improve the income distribution system and support the people to increase their income and create a happy life through labor. Taking a UHV transmission line project as an example, this paper studies the connotation, cost composition and calculation method of work-for-relief in overhead transmission line projects, so as to provide a reference for similar projects to carry out work-for-relief research.

Keywords

Work-for-Relief, overhead line engineering, cost calculation.

1. Requirements for Work-for-Relief

(1) Assist the State Grid UHV Department in clarifying the "work-for-relief" requirements in the bidding for construction and supervision; and agree on relevant responsibilities and obligations with construction units in engineering contracts. In the bidding documents for supervision and construction, "Notice of the General Office of the State Council Forwarding the National Development and Reform Commission on the Work Plan for Vigorously Implementing Work-for-Relief in Key Engineering Projects to Promote Employment and Income Increase of Local Masses" (Guo Ban Han [2022] No. 58) has been added to the main technical standards and requirements[1].

1) Supervision Bidding Documents: shall supervise the construction unit to implement the requirements of "Notice of the General Office of the State Council Forwarding the National Development and Reform Commission on the Work Plan for Vigorously Implementing Work-for-Relief in Key Engineering Projects to Promote Employment and Income Increase of Local Masses" (Guo Ban Han [2022] No. 58), and take the organization and management of work-for-relief workers at the construction site and the payment of labor remuneration as important contents of engineering supervision.

2) Construction Bidding Documents: each construction contractor shall strictly implement the requirements of "Notice of the General Office of the State Council Forwarding the National Development and Reform Commission on the Work Plan for Vigorously Implementing Work-for-Relief in Key Engineering Projects to Promote Employment and Income Increase of Local Masses" (Guo Ban Han [2022] No. 58).

(2) Fully communicate and cooperate closely with the county government where the project is located. After the project starts, make full use of the construction site machinery and equipment

of the project, adopt the mode of "training + employment",[2] and carry out labor skill training and safe production training jointly with the construction unit. Organize targeted labor skill training and safe production training for the engineering project to cultivate skilled laborers.

(3) Supervise and guide the construction unit to do a good job in the real-name system management of work-for-relief workers, such as contract signing, account registration and daily attendance. Supervise the construction unit to establish a unified and standardized employment roster and labor remuneration payment account. After being signed and confirmed by the workers, the labor remuneration shall be paid to the workers themselves through bank cards in principle, and the labor remuneration payment account shall be submitted to the relevant county-level departments for the record. Resolutely put an end to arrears,[3] deductions, fraud and other behaviors in the process of labor remuneration payment. Moreover, the wages of work-for-relief personnel shall not be lower than the local guaranteed wage level.

(4) Supervise the supervision unit to take the organization and management of work-for-relief workers at the construction site and the payment of labor remuneration as important contents of engineering supervision[4].

(5) In accordance with the requirements of the State Grid Corporation and the local government, organize the construction unit and other units to do a good job in the determination and acceptance of plan indicators. And the implementation of work-for-relief shall be included in the assessment.

2. Sub-projects Applicable for Work-for-Relief in the Project

On the premise of ensuring the quality and safety of the project and meeting the progress requirements, in accordance with the principle of "full application where possible", combined with the employment needs of local masses and the actual situation of the project, this paper introduces the work-for-relief positions to be provided by each sub-project of the A Line Project. The specific analysis is as follows:

2.1. Foundation Engineering

(1) Earth Excavation and Backfilling

The whole line of the project adopts mechanical construction. However, when the terrain and soil quality of the line project are special and mechanical operation is restricted, some tower foundations require manual earth excavation. Through simple training for local migrant workers, positions for manual earth excavation of foundations can be provided. The project mainly adopts mechanical earth excavation, but the bearing platform earth excavation of the project involves dry sand soil, which cannot be excavated mechanically and requires manual earth excavation. This part can provide positions for manual earth excavation.

(2) Foundation Hole Digging Positions

When the UHV line project is located in hills and mountainous areas, foundation construction is often restricted by traffic and terrain conditions, and a large number of foundations require manual hole digging. Through simple training for local migrant workers, positions for manual hole digging of foundations can be provided. The hole digging foundation of the project involves retaining wall work, which can provide manual operation positions.

(3) Commercial Concrete Pouring

The commercial concrete pouring process includes formwork fabrication, installation and removal, hoisting into the hole for alignment, installation of reinforcement cages and anchor bolts (inserted angle steel), assembly and disassembly of conduits and funnels, concrete transportation and pouring, compaction, curing, surface leveling, site cleaning, and tool transportation. Through simple training for local migrant workers, the A Line Project can

provide positions such as formwork installation and removal, concrete curing, site cleaning, and tool transportation.

(4) Spoil and Slurry Transportation Positions

According to the principles of spoil treatment, cast-in-place pile slurry treatment and environmental and water conservation requirements of the UHV project, through simple training for local migrant workers, positions for labor services in the transportation of foundation spoil (slurry) can be provided during the foundation construction stage. The hole digging pile foundation of the project involves the engineering quantity of spoil transportation, and the cast-in-place pile foundation involves the engineering quantity of slurry transportation. This part can provide positions for labor services in the transportation of foundation spoil (slurry).

2.2. Tower Engineering

Due to the mechanical construction of the project, there is no work-for-relief content involved temporarily.

2.3. Earthing Engineering

According to the relevant requirements of the work contents such as earthing trench excavation, earthing body installation and measurement in the earthing project, positions for site cleaning and tool transportation can be provided. When the earthing soil is rock and blasting technology cannot be used, manual excavation is required, and positions for manual excavation can be provided. The earthing project of the project can provide positions for site cleaning and tool transportation.

2.4. Stringing Engineering

Due to the mechanical construction of the project, there is no work-for-relief content involved temporarily.

2.5. Accessory Engineering

Due to the mechanical construction of the project, there is no work-for-relief content involved temporarily.

2.6. Auxiliary Engineering

(1) Construction Road Construction:

According to the characteristics of mechanical construction of the project, combined with the tower site terrain and traffic conditions, the A Line Project needs to build temporary roads, and positions for temporary road construction can be provided during the construction stage. The project can provide positions for temporary road construction for the manual operation part in subgrade shaping and steel plate laying.

(2) Environmental and Water Conservation Engineering

According to the environmental and water conservation requirements, the whole line of the A Line Project has auxiliary engineering quantities such as sowing grass seeds, shrub transplantation, straw checkerboard (stone checkerboard) sand fixation, drainage ditches, retaining walls, and slope protection. During the construction stage, positions for auxiliary environmental and water conservation projects such as vegetation restoration can be provided. For line projects located in deserts, grasslands, wetlands and other areas, positions such as desertified land management, degraded grassland management, and wetland protection and restoration can be considered. The project can provide positions for auxiliary environmental and water conservation projects, positions for cleaning the peak base surface, and positions related to straw checkerboard (stone checkerboard) sand fixation.

2.7. Other Parts

(1) Material Station Caretaker Positions

Each construction section shall set up material stations throughout the foundation construction, tower assembly and stringing stages to store various materials such as foundation steel bars, anchor bolts, tower materials, hardware, and conductors and ground wires. Positions for material station caretakers can be provided during the construction stage. The material stations involved in the project can provide positions for material station caretakers.

(2) Tree Felling and Transportation Positions

According to the situation of forest land occupation along the project, the total area of tree felling along the line is counted. Positions for tree felling and transportation can be provided during the construction stage. The tree felling and transportation work of the project can provide positions for tree felling and transportation.

(3) Site Restoration Positions

According to the situation of the line and the houses along the line, the area of house demolition for the project is counted. Positions for house demolition and site restoration can be provided during the construction stage. The project involves house demolition and can provide positions for house demolition and site restoration.

(4) Procurement of Supplier-Supplied Materials and Machinery Leasing

The relevant supplier-supplied materials involved in the project include: cement, medium sand, crushed stone, commercial concrete, steel bars, etc., all of which can be purchased locally.

The project adopts mechanical construction. If there are relevant mechanical equipment leasing services provided in the project location, priority shall be given to leasing relevant mechanical equipment locally.

For operation positions involved in sub-projects that are not particularly professional, non-high-altitude operations and have low construction risks, such as site cleaning positions and tool transportation positions, each sub-project can provide such operation positions.

3. Engineering Case

The A DC Line starts from a Province, and ends at c Province.The overall route of the line runs from northwest to southeast. The recommended route length is about 1065.4km (with a 1% margin), the aerial straight-line distance is 890km, and the tortuosity coefficient is 1.19. It is erected as a single-circuit bipolar line.

The terrain ratio along the line is: plain 525.1km (49.3%), hills 77.5km (7.3%), general mountainous areas 323.8km (30.4%), high mountains and ridges 66.4km (6.2%), steep ridges 19.0km (1.8%), and river networks/marshes 53.6km (5.0%). The altitude along the line ranges from 0 to 2000m.

There are four wind zones along the line: among them, the length of the 27m/s wind zone is 449.4km (42.2%), the 29m/s wind zone is 419.1km (39.3%), the 30m/s wind zone is 193.5km (18.2%), and the 32m/s wind zone is 3.4km (0.3%).

There are four ice zones along the line: among them, the length of the 10mm ice zone is 680.7km (63.9%), the 15mm ice zone is 277.9km (26.1%), the 20mm (heavy) ice zone is 96.7km (9.1%), and the 30mm ice zone is 10.1km (0.9%).

Table 1. Calculation of Total Work-for-Relief Costs

Design institute	Province	Project	Labor cost (ten thousand)				Materials for work-for-relief (ten thousand yuan)		Mechanical cost (ten thousand)	Total cost of public works for relief (ten thousand yuan)	Static investment (ten thousand yuan)	Ratio
			Quota labor cost	skilled worker	General worker	General worker's working day	Fixed consumption cost	Cost of main materials provided by Party B	Quota mechanical cost*30%			
A	a	Foundation Engineering	2714	847	1867	266692	116	2458	290	4731	83040	6.02 %
		Earthing Engineering	14	2	12	1688	1	87	2	102		
		Auxiliary Engineering	176	42	134	19132	6	4	23	167		
		Subtotal	**2904**	**891**	**2013**	**287512**	**123**	**2550**	**315**	5001		
B		Foundation Engineering	3098	1007	2076	296140	97	2124	296	4593	90209	5.45 %
		Earthing Engineering	74	10	62	8878	2	140	2	206		
		Auxiliary Engineering	142	40	102	14595	7	2	5	116		
		Subtotal	**3314**	**1056**	**2240**	**319613**	**106**	**2266**	**303**	4915		
C	b	Foundation Engineering	3100	1147	1953	279000	201	2283	341	4778	106503	5.44 %
		Earthing Engineering	73	16	57	8143	7	326	1	391		
		Auxiliary Engineering	618	167	451	64429	126	7	42	626		
		Subtotal	3791	1330	2461	351571	**334**	**2616**	**384**	5795		
D		Foundation Engineering	3700	1206	2494	312197	126	1969	351	4940	86398	6.26 %
		Earthing Engineering	104	17	87	12432	2	145	2	236		
		Auxiliary Engineering	250	59	191	23924	7	23	10	231		
		Subtotal	**4054**	**1282**	**2772**	**348553**	**135**	**2137**	**363**	**5407**		
E		Foundation Engineering	1345	529	815	116472	54	1731	306	2906	73892	6.19 %
		Earthing Engineering	50	7	43	6124	1	91	1	136		
		Auxiliary Engineering	884	79	804	35084	571	109	50	1534		
		Subtotal	**2279**	**615**	1662	157680	626	1931	**357**	**4576**		
F		Foundation Engineering	1134	490	644	85682	42	1519	282	2487	54591	5.20 %
		Earthing Engineering	8	2	6	1090	1	36	0	43		
		Auxiliary Engineering	98	30	68	10279	16	222	4	310		
		Subtotal	**1240**	**522**	**718**	**97051**	**59**	**1777**	**287**	2841		
G	c	Foundation Engineering	1039	513	501	71571	43	1734	199	2477	61105	4.41 %
		Earthing Engineering	11	2	10	1360	0	38	0	48		
		Auxiliary Engineering	123	32	91	13010	7	62	8	168		
		Subtotal	**1173**	**547**	**602**	**85941**	**50**	**1834**	**207**	2693		
H		Foundation Engineering	1167	467	700	100046	44	2401	242	3387	65849	5.85 %
		Earthing Engineering	25	4	21	3035	1	15	1	38		
		Auxiliary Engineering	77	46	31	4400	6	386	5	428		
		Subtotal	**1269**	**517**	**752**	**107481**	**51**	**2802**	**248**	3853		
I		Foundation Engineering	1176	588	587	72524	39	2098	241	2965	63247	4.99 %
		Earthing Engineering	18	3	16	1984	1	52	1	70		
		Auxiliary Engineering	135	32	103	12287	7	1	8	119		
		Subtotal	**1329**	**623**	**706**	**86795**	**47**	**2151**	**250**	3154		
Total			**21353**	**7383**	**13927**	**1842197**	**1531**	**20064**	**2714**	**38235**	**684834**	**5.58 %**

The estimated total static investment of the project is about 684,834 ten thousand yuan. The relevant work-for-relief costs are about 38,235 ten thousand yuan, accounting for 5.58% of the static investment. Among them, the unskilled workers' labor cost is 13,927 ten thousand yuan; the quota consumable materials cost is 1,531 ten thousand yuan; the supplier-supplied main materials cost is 20,064 ten thousand yuan; and the machinery cost is 2,714 ten thousand yuan.

The total number of unskilled worker days for the project is 1.8422 million, with an average of 70 yuan per worker day. In accordance with the relevant provisions of work-for-relief, making full use of the local surplus labor force, while improving the local infrastructure, the A Line Project can enable local masses to obtain labor remuneration of 13,927 ten thousand yuan. The procurement of relevant materials and machinery leasing can provide 24,309 ten thousand yuan for the local area.

4. Conclusion and Suggestions

The project implements the work-for-relief requirements of "Guo Ban Han [2022] No. 58" and "Fa Gai Zhen Xing [2022] No. 1563" in accordance with the principle of "full application where possible".

The work-for-relief positions in the sub-projects of foundation engineering, earthing engineering and auxiliary engineering of the project include: manual hole digging positions, installation and removal positions, concrete curing positions, site cleaning positions, tool transportation positions, transportation labor positions, temporary road construction positions, material station caretaker positions, tree felling and transportation positions, and site restoration positions.

The relevant supplier-supplied materials involved in the project, including: cement, medium sand, crushed stone, commercial concrete, and steel bars, shall be purchased locally first; for mechanical equipment leasing services, priority shall be given to leasing relevant mechanical equipment locally.

The A Line Project can enable local masses to obtain labor remuneration of 13,927 ten thousand yuan. The procurement of relevant materials and machinery leasing can provide 24,309 ten thousand yuan for the local area.

It is suggested that during the project implementation stage, full communication should be carried out with the local government to accurately grasp the objects and scope of work-for-relief implementation, and work-for-relief should be implemented as much as possible to help local masses find employment nearby and increase their income.

References

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