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Repairs of Coal Processing Buildings under Continuing Production

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Summary

In the paper the technology of repair of corrosion damaged, reinforced concrete floor of level +6.00 m in coal processing building. Repair of the floor was carried out under continuing production; no breaks in production occurred. The range and degree of corrosion damage, the methods of reinforcement of load-bearing structure and sealing of tile floor were described.

1. Introduction

Production floors in coal processing building are endangered to intensive mechanical influence (static and dynamic ones), chemical and physical ones, related to compound dry and wet coal processing enrichment. This causes that floor undergoes damage in shorter time reducing safety condition of construction. Then, the unavoidable repair, for the sake of large areas of floor, numerous mechanical devices located on it (screens, crushers, conveyers, channels and troughs) as well as continuous affect of brine make very difficult technical problem. In the paper an example solution of such problem is presented for highly damaged reinforced concrete floor of + 6.00 m level taking into account additional requirements of the user:

- devices mounted on the floor must be kept in operation all the time and longer breaks in operation are not allowed,
- one may assume weekly stoppage of these devices from Saturday up to Monday, that provides 48 hours breaks,
- of 4 railway loading flights situated over the floor - only one could be stopped - the extreme one,
- it shall be possible to carry out the repair work beyond the reach of devices within the whole week, however assuming that the greater part of the floor is continuously flooded with brine - only disassembly work could be accepted.

2. Description of floor construction and its damage

Intensely operated floor for 30 years has monolithic, reinforced concrete, slab-rib structure supported with skeleton studs of coal processing building structure. Length of the floor is $9 \times 6.0 = 54$ m and width is $4 \times 6.0 = 24$ m. Due to difficult operation conditions and first of all continuous influence of aggressive washing water on concrete and steel, the floor has various degree of corrosion damage on most part of area. The most severe damage occur where brine leaks through the floor slab. Aggressive water flowing down on beam surface make sulfate and magnesium corrosion as well as pitting of reinforced steel. It had been observed that some parts of beams have pit damage of concrete structure in area of leakage, sometime in form of through openings.. On upper part of the floor the numerous defects of concrete floor were found.

3. The repair technology

Authors suggested to unload the floor with stay ropes and horizontal steel beams. Fig.1 presents the idea of unloading. The feature of this solution was that instead of main beams the secondary beams or floor slab were underslung to traverse beam. This enabled the possibility of free access to parts being repaired. After unloading, the corroded weak concrete was removed without removing reinforcement steel and surface was cleaned using wet sand blasting.

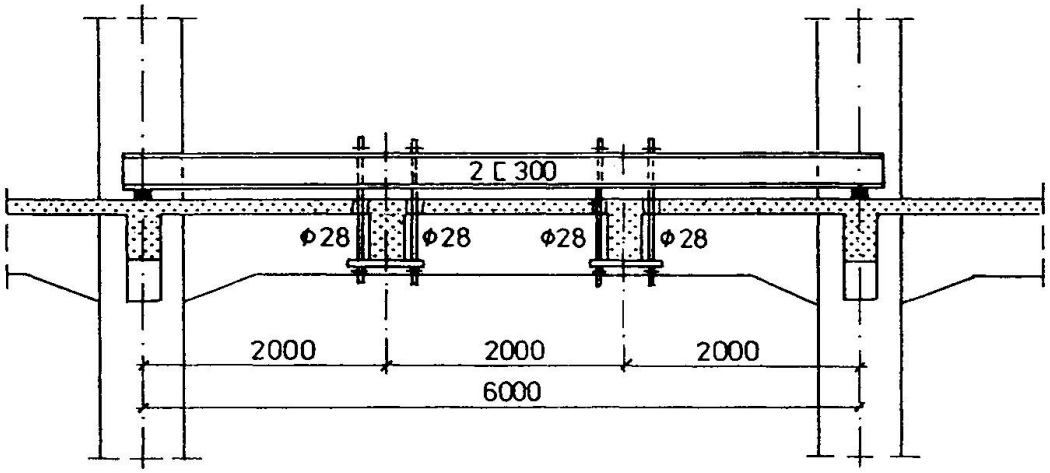

Fig.1 The method of suspending of secondary beams and unloading the stay ropes

After boarding was made, the removed part of concrete was filled with fast-setting cement. When concrete achieved required strength the boarding and unloading steel construction were dismantled and openings made for strings of suspensions were sealed. The next stage included repairing of damaged floor and sealing of construction to eliminate the leakage. Due to necessity to continue the production and short break of wet processes (48 hours in week) application of standard solutions of watertight insulation could not be taken into account.

4. Conclusion

The example presented in the paper proves that having modern insulation and renovation materials available , it is possible to repair the reinforced concrete industrial structures, strongly damaged with corrosion, under continuing production.