

3/62548/2021

## NORTH WESTERN RAILWAY



Headquarter office,  
Near Jawahar Circle,  
Malviya Nagar,  
Jaipur 302017  
Dated- 10.08.2021

No. HQ/W/374/1/Contract policy/Vol.V

Sr.DEN.Co.,  
All, BKN, JP& JU

Sub:- Guideline for Dewatering of accumulated water from LHS.

On elimination of LCs with LHSs, it is the responsibility of railway that movement of road vehicle through LHS remains unhindered and smooth. Accumulation of rainwater in LHS is observed especially during monsoon and lot of criticism is faced by railway. To drain out the water from LHS, dewatering is done mainly with the diesel pumps so as to ensure the uninterrupted movement of road traffic through LHS.

Divisions are finalising the contractual agency for the execution of dewatering at LHSs but due to poor contract management, complaints are being received from the public and from Railway vigilance. These complaints are either for delay in drain out of water or improper measurement of work executed and record keeping.

To streamline the contract management of work for dewatering from LHS, following guidelines are issued:

1. Division should adopt same type of item and conditions for entire division for dewatering contract to keep uniformity. As far as possible separate contract for dewatering should be planned.
2. LHSs are spread over in the sections so management of dewatering can be done more efficiently by SSE/P.way. Therefore, responsibility for management of the contract should be given to concerned SSE/P.Way.
3. Minimum 50% pumps (i.e. 50% of total LHS taken in the contract) along with adequate pipe length and required accessories etc. should be available with the contractor. It should be verified by the SSE/P.way before commencement of Monsoon.
4. Location for the installation of pump and scheme draining out of pumped water should be finalised jointly by the contractor and SSE/P.way before the commencement of monsoon.
5. Pumps propose to be installed, should be of a reputed brand. These should be inspected by concerned SSE/P.way for the HP, head etc before installation. Generally, manufacturer of the pump set engraves details regarding the capacity of pump like Head (m), discharge (Cusec), pump efficiency, RPM. If it is not possible to inspect before installation due to any unavoidable reason, it should be inspected at the first available opportunity.

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6. Any crude arrangement which does not specify the HP of pump set, should not be allowed to use otherwise it will be difficult to measure the pumping HP-Hours.
7. Capacity, number, type of pump and pumping hours for particular LHS will be decided in advance duly giving reasons and signed by ADEN of the section and SSE/P.Way. However, in any case capacity of pump should not be less than 7.5 HP. In case of likely excess of over 25% of pre- determined HP-Hours than timely approval of sectional Sr.DEN/DEN should be taken. Sectional Sr. DEN/DEN while approving excess HP-Hours should consider photographs of site, temporal & spatial variation of rainfall and site requirement etc.
8. Time limit for complete dewatering for each LHS covered in contract shall be specified. Accordingly, capacity of pumps to be deployed, depending upon quantum of water likely to enter, shall be decided. Normally LHS shall be dewatered within 3-4 hrs of informing the contractor about flooding.
9. A proper record of pumping hours of each pump shall be maintained by contractor in log book. 1<sup>st</sup> page of Log book pages should be signed by SSE/ P.Way and serially numbered. No cutting/ overwriting in log book should be permitted.
10. Contractor shall depute experienced pump operator for drain out the water from LHS/RUB. Operator must be in possession of a working cell phone and its no. should be available with concern SSE & ADEN. Contractor and his operator will respond to the Railway calls 24x7 hours.
11. All accessories in adequate quantity i.e. Suction/ delivery pipe, foot valve etc and spare parts should be available at LHS site to meet the emergent repairs of pump.
12. SSE/P.Way and ADEN shall ensure that there should not be any stagnation of water during monsoon in any LHS or RUB. Deterrent penalty provision should be kept in the contract for the default of contractor.
13. Log book showing starting and closing time at each LHS/RUB duly signed by Railway representative and contractor/representative shall be the base of payment. Sample of the log book is enclosed as Annexure-I.
14. Muck/ Sludges after dewatering shall be removed immediately with the help of JCB/ Excavator/ Manually within 3-4 hours of pumping out of water.
15. Log book should be checked, scrutinised and initialled by SSE, ADEN & DEN/Sr.DEN during their trolly inspection/ other inspections.
16. Dewatering of LHSs maintained by Road Authorities/ Local bodies, should be taken care by them. However, Divisions should keep close coordination with the respective authorities.

This is issued with the approval of PCE/NWR.

Signed by Om Prakash  
Meena  
Date: 10-08-2021 16:31:58  
Reason: Approved  
Chief Engineer/Works

- Copy to:- (i) PCE/NWR- For information please.  
(ii) CPD/BW, CPD/SD -For information please.  
(iii) CE/RSW, Dy CVO/NWR – For information please.



## North Western Railway

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Date.21.11.2019

No. HQ/W/493/1/Misc./maint./13/Pt.III

**Sr. DEN (Co.)  
All, BKN, JP & JU**

**Sub: - Quality assurance in vacuum dewatered concrete**

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Vacuum dewatering is widely used in present construction works. Basically, the vacuum dewatering process improves strength, durability and other properties of concrete by reducing water cement ratio immediately after the mix is placed & vibrated, usually in floor and other flat works. Compressive strength improvements of about 30 percent over conventional finished concrete are reported. The gain in strength is greatest at the upper wearing surface of the slab where it is most needed. Quality variation evidenced by slump difference from load to load of ready mixed concrete can be eliminated because the vacuum process eliminates variation in water content. Permeability of concrete is relatively reduced by vacuum dewatering. Joint spacing can be increased because vacuum dewatering reduces shrinkage of floor slab concrete.

**A. Precautions to be taken in field :-**

Basically vacuum dewatering is an addition process of concreting to improve its quality. Best performance of concrete depends on practice of good quality of concrete followed. Some precaution to be taken at work site are mentioned below.

1. Raw material of concrete like cement, sand and aggregates needs to checked as per relevant IS code.
2. Approval of design mix of concrete should be given by sectional DEN/Sr.DEN based on the trial mix report.
3. All T&P and equipments i.e. sieve sets of coarse aggregate/ fine aggregate ,Slump equipment, digital concrete mixer, cube sets, alignment thread, water level or level instrument, M.S. side track rails, surface skid vibrator, levelling beam, wire brushes, floater, mechanical trowel, vacuum mats and vacuum pump, etc should be available before commencement of work.
4. Correction in field regarding moisture adjustment, gradation of aggregates should be done before commencement of concrete. Water should be controlled as per design mix otherwise whole purpose of design mix will get defeated.

## B. Specification of Machineries

Important components of vacuum dewatering system comprises of following with certain specifications:

Vacuum pump	Continuous discharge, electric motor 7.5 HP approx mounted on a transportation trolley, with a capacity to dewater 35 sqm in one operation. Suction hose 15 m long with drain hose fitting complete. Note : Absence of vacuum Leakage through suction nose to be ensured.
Power trowel	Blade set fitted (dia. 0.9m), powered by 3 hp motor with special quality speed transmitter
Power floater	Disc fitted (dia. 0.9m), powered by 3 hp motor with special quality speed transmitter
Double beam screed board vibrator	Fitted with 2 hp electric motor & the unique system for beams
Top mat	Special synthetic cloth size approx (5m x 7m) complete with junction box & hose .
Filter mat (sieve mat)	Suction filter bottom mat of suitable size. It is Special high class nylon filter is fixed on plastic mats which acts a filter during the vacuum operation filter Note : Periodic cleaning of filters needs to be ensured.

## C. Work Procedure:-

There are well laid down procedure and guidelines for dewatering, however some of the important points are reiterated as under:-

1. Surface where concrete is to be laid shall be hard & well compacted ,made free from dust, grease, loose material and wetted to have just moist surface. VDC should not be laid on loosely filled soil.
2. Fixing of two side track rails/channels at desired level. M.S. Rails/channel shall also be fixed at start and end wherever required. Marking of levels by driving pegs is a very important activity to ensure the proper slope of concrete floor.
3. Placing/pouring of concrete shall be done in horizontal layers.
4. Then, with the help of screed vibrator the surface is vibrated and compacted.
5. Immediately after surface vibration( within ½ hr of laying the concrete) , Vacuum dewatering is done with the Equipment comprising of Suction Mat Top Cover, Filter pads and Vacuum Pump. Filter pads are placed on the fresh concrete leaving about 4 inches of fresh concrete exposed on all sides. The Top Cover is then placed on the filter pads and

rolled out till it covers the strips of exposed concrete on all sides. The Top Cover is then connected to the vacuum pump through a suction hose and the pump is started.

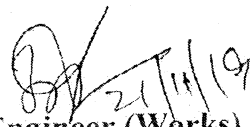
6. Vacuum is immediately created between the filter pads and the top cover. Atmospheric pressure compresses the concrete and the surplus water is squeezed out. This process reduces the effective W/C ratio and enhance the strength & surface hardness of concrete. Dewatering operation takes approximately 1.5-2 minutes per centimeter thickness of the floor i.e. for 100mm thick concrete duration of dewatering operation will be 15 to 20 Minute.
7. The dewatered concrete is dried to such an extent that it is possible to walk on it without leaving any footprints. This is the indication of concrete being properly dewatered and ready for finishing.
8. Thereafter, floating operation should be started with power operated floaters and floating shall be continued till desired finish is obtained. Wherever required brooming shall be done. Brooming should be so executed that the corrugations formed shall be uniform in character and width and not more than 1.5mm deep.
9. After surface hardens curing shall be started by ponding and shall be continued for minimum 7 days or as advised by site supervisor.
10. Joints in concrete for contraction shall be cut with in 24 hrs. of casting of concrete and depth should be at least 40% of thickness of concrete slab . Panel formed by joints cutting should not more than 3m lateral & horizontal distance. No expansion joint is needed in VDC.
11. Groove of joints should be filled with hot poured sealing compound conforming to grade B of IS: 1834. Prior to filling with sealing compound, the joint shall be cleaned by compressed air.

Proper documentation of casting, sampling, time of casting, Qty of water pumped out/sqm and time of groove cutting should be ensured in site registers. ADEN shall check the VDC work site frequently for its quality and proper following of procedure. Sectional DEN/Sr.DEN shall also test check the availability of equipments, procedure followed, quality, scrutinize the registers etc. during their inspections.

It is therefore requested to follow the guide lines and specifications for the good quality of VDC work. Before making payment, dewatering of atleast 10 % of mixed water and cutting of joint within stipulated time shall be one of the accepting criteria of the work in addition to other criteria of acceptance.

While doing VDC on PF surface, suitable provision of small trenches/ducts shall be kept for laying water pipe lines, electrical/communication cables etc.

This has the approval of PCE/NWR.

  
Chief Engineer (Works)