
DMSA TECHNICAL NOTE (TN-007)

Pumpability Problems & Pipeline Blockages

Objective

To help engineers identify, investigate and prevent pumpability problems and concrete pipeline blockages during pumping operations.

Problem Statement

Concrete pipeline blockages can interrupt concreting, cause delays and lead to significant site problems. A blockage should not be treated only as a pump problem; the complete concrete pumping system should be investigated to identify the actual cause.

Background

Concrete pumpability depends on the interaction of concrete properties, workability retention, mix cohesiveness, pipeline layout, pipeline condition and pumping practices. Changes in workability, unsuitable pipeline arrangements, inadequate priming or interruptions in pumping can contribute to blockage.

Symptoms

- Sudden increase in pump pressure during pumping.
- Reduction or complete stoppage of concrete flow through the pipeline.
- Repeated blockage at specific bends, reducers or sections of pipeline.
- Concrete becoming difficult to pump or showing loss of workability.
- Pump pressure increasing even though the receiving end is not delivering concrete normally.

Investigation Checklist

- Record concrete slump/workability at dispatch, arrival and near the pump.
- Check concrete temperature and time elapsed from batching to pumping.
- Review mix proportions, fines content, aggregate grading and cohesiveness.
- Inspect pipeline length, diameter, bends, reducers and vertical/horizontal arrangement.
- Check pipeline condition, joints, couplings and internal obstructions.

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- Verify priming procedure before starting concrete pumping.
 - Review pumping sequence, stoppages and restarting practices.
 - Check whether the blockage occurs at the same location repeatedly.
 - Review pump pressure and operator observations before the blockage.

Root Cause Analysis

Concrete Properties



Workability / Cohesiveness



Pipeline Layout & Condition



Priming / Pumping Practices



Workability Loss / Segregation / Excessive Resistance



Pipeline Blockage

Recommended Solutions

- Maintain suitable and consistent workability for the complete pumping distance.
- Review mix cohesiveness and aggregate grading where pumping problems recur.
- Use appropriate pipeline diameter, bends and reducers for the pumping requirement.
- Ensure proper pipeline priming before concrete pumping.
- Minimize unnecessary bends and abrupt changes in pipeline direction.
- Avoid prolonged stoppages and follow controlled restarting procedures.
- Inspect and clean the pipeline after pumping and before the next operation.

Preventive Measures

- Plan the complete pumping route before concreting starts.
- Check pipeline supports, joints, bends and reducers before pumping.
- Confirm concrete workability and retention before dispatch.
- Keep the pump, pipeline and manpower ready before concrete arrival.
- Monitor pumping pressure and concrete flow continuously.
- Record the location and circumstances of every blockage for root cause analysis.

Important Do's

- Check the complete pumping system before starting concreting.
- Maintain consistent concrete workability.
- Prime the pipeline properly before pumping.
- Monitor pump pressure and flow during pumping.
- Investigate repeated blockages at the same location immediately.

Important Don'ts

- Do not treat every blockage as a pump failure.
- Do not ignore sudden increases in pumping pressure.
- Do not use an unsuitable pipeline arrangement for the pumping distance.
- Do not allow unnecessary stoppages during pumping.
- Do not restart pumping without identifying the reason for a blockage.

Relevant IS Codes

- IS 4926 — Ready Mixed Concrete — Specification.
- IS 10262 — Concrete Mix Proportioning — Guidelines.
- IS 456 — Plain and Reinforced Concrete — Code of Practice.

Practical Tips

- Pumpability is a property of the concrete-pump-pipeline system, not of the pump alone.
- Repeated blockage at the same pipeline location is an important investigation clue.
- Workability at dispatch may not represent workability at the pump.
- Pipeline layout can significantly influence pumping resistance.
- Recording pump pressure and blockage location helps identify recurring causes.

SM Insight

A pipeline blockage is often the final symptom of a problem that started earlier in the concrete-pumping system. Don't clear the blockage first and stop there—investigate the concrete, pipeline layout, pipeline condition and pumping practice that allowed the blockage to occur.

Key Learning

Pumpability problems and pipeline blockages should be investigated as a complete system involving concrete properties, workability, pipeline arrangement, pipeline condition and pumping practices. Proper planning, monitoring and disciplined pumping procedures can prevent many recurring blockages.

Need Technical Assistance?

DMSA provides engineering investigation, root cause analysis and practical site solutions for concrete pumping problems, pipeline blockages, fresh concrete defects, durability problems and quality control practices.

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