
Slump Loss During Transportation | DMSA Technical Note (TN-003)

1. Objective

To help engineers identify the reasons for slump loss during transportation and ensure concrete reaches the site with the required workability.

2. Background

Some slump loss during transportation is normal. However, excessive slump loss can make concrete difficult to place and pump and indicates that the complete process should be investigated.

Slump loss during transportation should not be viewed only as a concrete mix problem. The actual behaviour can be influenced by the materials, production process, admixture dosage, concrete temperature, transit duration, traffic delays, transit mixer operation and waiting time at site.

The objective should be to understand where and why the workability is being lost before deciding on corrective action.

3. Problem Statement

Concrete often leaves the RMC plant with the correct slump but reaches the site with reduced workability.

The result may be difficulty in placing, pumping or finishing the concrete. In many cases, the immediate demand at site is to add water.

Before taking such corrective action, the engineer should establish where the slump loss occurred and what caused it.

The important question is not only: "Why has the slump reduced?" It is: "At which stage did the concrete lose workability, and why?"

4. Engineering Principle

Slump loss during transportation is a time-dependent field problem influenced by the interaction of concrete materials, production, transportation and site operations.

A proper investigation should therefore consider the complete journey of the concrete:

Mix Design → Production → Dispatch → Transportation → Site Waiting → Slump Testing → Placing

The plant slump alone cannot explain what happens to the concrete by the time it reaches the point of placement.

5. Slump Loss During Transportation – Symptoms

- Slump at site is lower than the dispatch slump.
- Concrete becomes difficult to place.
- Pumping becomes difficult.
- Additional water is demanded at site.
- Concrete appears stiff before placing.
- Slump loss is repeatedly observed on certain routes, vehicles or delivery conditions.
- Slump loss becomes more noticeable during hot weather or long waiting periods.

6. Causes of Slump Loss During Transportation

Slump loss during transportation can have more than one cause. Investigation should cover the following areas.

Material Related

- Cement-admixture incompatibility.
- Highly absorbent aggregates.
- High cement content.
- Incorrect admixture selection.

Production Related

- Low initial slump.
- Incorrect admixture dosage.
- Inadequate mixing.
- High concrete temperature.

Transportation Related

- Long transit time.
- Traffic delays.
- Transit mixer not rotating properly.
- Waiting at site before unloading.

Site Related

- Delay in unloading.
- Poor site planning.
- Long pumping delays.
- Hot and windy weather.

7. Investigation Checklist

- ☐ Compare plant slump and site slump.
- ☐ Check dispatch time and unloading time.
- ☐ Verify actual transit duration.
- ☐ Check transit mixer drum rotation during transportation.
- ☐ Review weather conditions.
- ☐ Verify admixture dosage.
- ☐ Check concrete temperature.
- ☐ Review site readiness before dispatch.
- ☐ Check whether the problem occurs in all loads or only specific trips.
- ☐ Record plant slump, site slump and transit time together.

8. Root Cause Analysis

Do not start the investigation by blaming the admixture or changing the mix design.

Investigate the complete sequence:

Mix Design → Production → Dispatch → Transportation → Site Waiting Time → Slump Testing → Placing

The purpose is to identify the stage at which the major workability loss occurs.

If the slump loss is associated mainly with long transit time, traffic delay or site waiting, the solution may be better logistics and coordination rather than a change in concrete composition.

If the slump loss is consistently observed despite controlled transportation and site conditions, the mix design, material compatibility, admixture selection or dosage should then be reviewed.

9. Solutions for Slump Loss During Transportation

- Use a suitable slump-retention admixture where required.
- Improve dispatch planning.
- Reduce waiting time at site.
- Ensure transit mixers rotate correctly.
- Dispatch concrete only when the site is ready.
- Review the mix design if slump loss is frequent.
- Monitor concrete temperature, particularly under hot-weather conditions.
- Coordinate the RMC plant, transit mixer and site team so that concrete is received and placed without unnecessary delay.

10. Preventive Practices

- Plan deliveries properly.
- Minimize unnecessary transit time.
- Monitor concrete temperature.
- Use compatible cement-admixture combinations.
- Maintain correct admixture dosage.
- Keep transit mixers operating correctly.
- Coordinate dispatch with actual site readiness.
- Train plant and site personnel to record and respond to workability changes.
- Review repeated slump-loss complaints as engineering data rather than treating each occurrence as an isolated event.

11. Important Do's

- Measure slump at both plant and site.
- Record transit time.
- Keep transit mixers rotating correctly.
- Coordinate dispatch with site readiness.
- Record plant slump, site slump and transit time together.
- Investigate repeated slump-loss patterns.
- Check the complete delivery process before modifying the mix.

12. Important Don'ts

- Do not add water without proper approval.
- Do not dispatch concrete when the site is not ready.
- Do not ignore repeated slump-loss complaints.
- Do not blame the admixture without proper investigation.
- Do not change the mix design before checking transportation and site conditions.
- Do not treat every slump-loss problem as a material problem.

13. Relevant IS Codes

- IS 456
- IS 4926
- IS 10262
- IS 9103

14. Practical Tips

- A dispatch delay of even 20–30 minutes can significantly increase slump loss in hot weather.
- Review traffic routes when supplying concrete over long distances.
- Check whether slump loss occurs in all loads or only in specific trips.
- Always record plant slump, site slump and transit time together.
- Look for patterns before changing the mix.
- If the problem appears only during certain trips or under certain site conditions, investigate the logistics before changing the concrete mix.

15. DMSA Engineering Recommendation

Slump loss during transportation should be controlled through a combination of proper mix design, suitable admixture selection, efficient transportation and good site planning.

Before adding water or changing the mix, establish the actual cause of the slump loss.

In many cases, the solution may be better coordination between the RMC plant, transit mixer and site rather than a major change in the concrete mix.

Every repeated slump-loss complaint should be treated as useful engineering information and investigated accordingly.

16. SM Technical Logic

Slump loss is not always a concrete problem.

Before changing the mix, check the journey of the concrete.

Plant → Transit → Traffic → Waiting → Site → Placing

Find where the workability was lost.

Then solve the actual problem.

SMCC Discussion Reference

This Technical Note is linked to the SMCC Weekly Technical Discussion on slump and workability.

SMCC Discussion — Week 45

The discussion and consensus provide the practical field context behind this Technical Note.

Document Information

Document No.: TN-003

Document Title: Slump Loss During Transportation

Series: DMSA Technical Notes

Version: 1.0

Status: Approved

Knowledge Source: SMKH – SM Knowledge Hub

Discussion Reference: SMCC Week 45



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