



A GUIDE TO CHALLENGES IN (PRE-CAST CONSTRUCTION)

CHALLENGES | SCIENTIFIC REASONS | PRACTICAL FAILURES | PROVEN SOLUTIONS

FOREWORD

Precast construction is transforming how India builds – faster, cleaner, and more predictable. Yet across thousands of residential and commercial sites, recurring technical issues continue to surface cracking, seepage, adhesion failures, aesthetic defects, and maintenance challenges.

These problems are not due to precast technology itself, but arise from material incompatibility, improper treatment of joints, rigid fillers, and dependence on traditional plastering techniques that are unsuited for precast surfaces. This guide consolidates scientific explanations, ground-level experience, common failure patterns and proven corrective as well as preventive methodologies.

It also introduces materials engineered specifically for precast structures. **FTR** surface and structure protection systems and solutions have been engineered to cater to a variety of modern day construction methods and challenges, the product has been developed around the idea 'One nation, one solution' which translates to addressing a variety of challenges across the variety of climatic and environmental conditions while also adhering to compatibility and strength.

FTR systems have demonstrated unmatched performance and reliability across Indian climatic conditions, ranging from extreme cold, dry heat to monsoons and proven demonstrations in various regions across India.

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1. WHAT IS PRECAST CONSTRUCTION ?

Precast construction refers to manufacturing building → components in a controlled factory environment and assembling them at the project site.

Why Precast is used ? The Precast method eliminates or reduces delays and challenges associated with conventional RCC construction such as:

- Unpredictable labour
- On-site curing time
- Quality variations
- Weather dependency
- Slow installation
- Non-availability of red bricks

Most common pre-cast components that are used used in construction



• Wall panels



• Slabs



• Staircases



• Beams & columns



• Façade elements



• Balcony units

Various types of buildings actively being constructed using the precast method:

- Affordable housing
- Multi-storey apartments
- Large-scale real estate Villas
- Hostels, Schools, Hospitals
- Government smart-city projects
- Warehousing & industrial parks
- Pod construction

2. TYPES OF PRECAST SYSTEMS

Precast systems generally fall into four categories:

Precast construction is an industrial method where building components are manufactured in a controlled factory environment and then transported to the construction site for assembly. Understanding its types is crucial for selecting the most appropriate, efficient, and cost-effective system for a specific project's needs.



A. Structural Precast:

Structural components like beams, load bearing heavy walls, slabs, pillars etc.



B. Architectural Precast:

focuses on aesthetic qualities to enhance a building's appearance



C. Hybrid Precast:

Hybrid Precast combines the benefits of factory-made precast concrete elements with on-site, traditional cast-in-situ concrete or other materials like steel and wood



D. Lightweight Walling Precast Panels:

engineered to be lighter, typically by incorporating different materials or altering the concrete's composition

3. ADVANTAGES / CHALLENGES / SOLUTIONS

Technical Advantages

- Factory Controlled Uniform Strength & Quality Dimensional Accuracy Within Millimeters Faster Installation (days Instead Of Months) Reduce Dependency On - Site Labour Minimal Wet Work
- Service Are Pre-Installed

Financial Advantages

- Faster Project Turnover→ Higher ROI
- Predictable Timelines→ Better Planning
- Lower Labour Cost
- Lesser Rework And Wastage

Environmental Advantages

- Lower Water Consumption
- Minimal Dust Generation
- Controlled Material Usage
- Superior Finish Better Waste Recycling No Curing Required Post Installation

4. REAL CHALLENGES IN PRECAST PROJECTS .

Despite its strengths, Precast construction faces recurring practical issues:

A. Joint-Related Issues

- Cracks At Vertical Panel Joints
- Cracks At Vertical And Horizontal Joints On The Exteriors
- Gaps at ceiling-wall junctions
- Cracks between precast panels and AAC blocks
- Voids Inside Joints
- "Live Cracks" That Reappear

B. Surface Defects

- Pinhole Formation
- Undulation on the Surface
- Honeycombing Pockets
- Undulations After Repairs
- Uneven Gas Around Joints
- Panel joints crack after painting

C. Leakages Related Issues

- Seepage at vertical and horizontal joints on the exterior .
- Seepage at vertical and horizontal joints at the floor level in the interiors
- Terrace leak at corners and slab joints Moisture entry at floor joints Water seepage through window jamb gaps

D. Adhesion Failures

- Putty peeling off on-porous precast
- Tile bonding failures
- Mortar not bonding inside gaps

6. IDEAL MATERIAL REQUIREMENTS FOR PRECAST (Vertical Surface*).

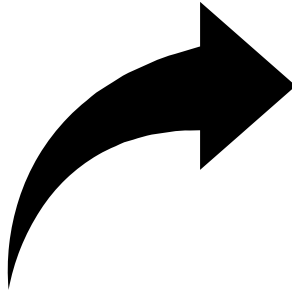
*Vertical means areas where water flows

A suitable precast treatment material must offer:

- High Adhesion
- Elastomeric
- Void Impregnation
- Hydrophobic
- Film Formation
- Water Repellent
- Homogenic
- Anti carbonation

Traditional cement-based materials cannot offer these combined properties.

The perfect solution



This system is tested and applied across multiple Indian precast projects.

Key Capabilities.

- Deep Penetration
- Superior Adhesion
- Elastic Response
- Hydrophobic Film
- Flexible As Opposed
- Continuous Protective Skin
- Homogeneity
- Finish-Ready
- Supreme Adhesion

Areas of Utility in precast

- External Vertical Joints
- External Horizontal Joints
- Internal Vertical Joints
- Internal Ceiling Corner Joints
- Internal Ceiling Panel Joints
- Across the surface

Ensures.

- Zero Seepage
- No Gaps
- Smooth Painting
- Longer Life
- Improved Strength
- Homogenous Finish
- Cost efficiency- Lower
- Maintenance Cost
- Material Efficiency
- Premium Finish

Application Procedure - ERP (Smooth)

Step 1: Joint Preparation

- Clean the **vertical and horizontal joints thoroughly**.
- Remove all dust, debris, and loose particles.
- Ensure the substrate is sound, firm, and free from contaminants.

Step 2: Joint Filling

- Fill the prepared joints completely with **ERP**.
- Allow the filled joints to dry thoroughly before proceeding.

Step 3: First Coat (Joint Reinforcement)

- Apply **ERP** over the joint, extending to a width of **6 inches** on either side, with a thickness of approximately 2 mm.
- While the surface is still wet, **embed mesh** properly.
- Remove excess material to achieve an even layer.
- Allow the coat to dry for **8 to 10 hours**.

Step 4: Second Coat (Leveling)

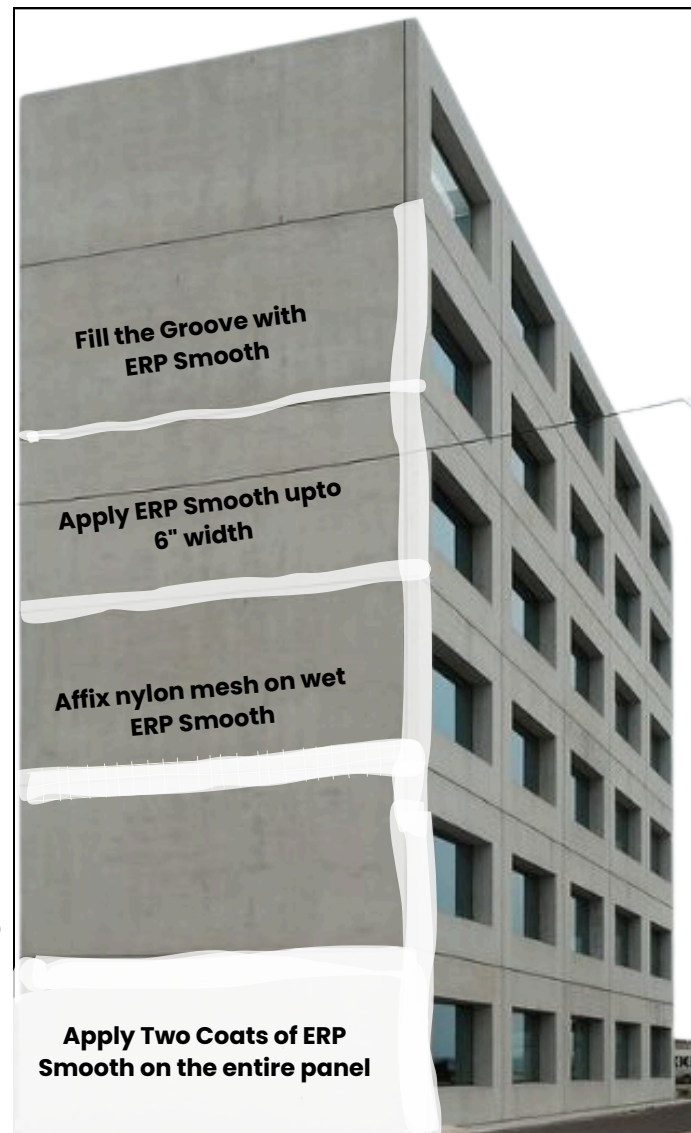
- Apply **ERP** over the dried area using a roller.
- Allow the material to settle for **10 to 15 minutes**.
- Remove excess material using a blade or trowel to obtain a smooth, level surface.

Step 5: Surface Finishing

- Remove any rough patches or loose particles from the finished surface using a **dry blade**.

Full Panel Treatment

- Apply **ERP** uniformly across the entire surface, including all joints.
- Use a roller and move it in **all eight directions** to ensure complete filling of voids and pinholes.
- Allow the material to stand for **5 to 10 minutes**, then swipe off excess material to achieve a uniform surface.
- Apply a **second coat of ERP** to obtain a smooth, finished surface.



NoSeep Series – Horizontal Waterproofing System

- **Designed for horizontal** surfaces where water stagnation occurs
- **Deep impregnation** into concrete pores and capillaries
- **Excellent adhesion** to dense precast and in-situ concrete
- **Continuous film formation** after impregnation
- **UV resistant**, suitable for exposed terraces and slabs
- **Elastomeric**, accommodates thermal and micro-structural movement

NoSeep series comes in Two format.

NoSeep-1: Impregnates Smaller voids and pores and seals them completely. This can be brush applied and the maximum thickness derived is around 45-50 microns. It will form a flexible water repellent film. NO SEEP 1 comes is in liquid form.



NoSeep-2. This is used to fill bigger voids and to make the surface abrasion-resistant. Must be used along with nylon membrane/mesh as a reinforcing agent. NoSeep- 2 comes in a paste form.

Areas of Utility in Pre cast(Horizontal Waterproofing).

- **Internal Vertical and Floor Joints**
- **Internal Sunken portion**
- **External Terrace**
- **Water Tanks**

Application Procedure–Horizontal Waterproofing

Step 1: Surface Application with NoSeep-1

- Apply **NoSeep-1** using a brush at all peripheral joints, especially at the junctions between vertical and horizontal panels.
- In the first coat, treat all joints and major visible cracks thoroughly.
- Apply two coats at all joints.
- Allow the joint treatment to dry for 8 hours.
- Apply **NoSeep-1** using a roller across the entire horizontal surface.
- Extend the application onto the parapet wall / vertical wall to a minimum height of 150 mm.
- Apply two coats, maintaining a gap of 8 to 10 hours between coats.



Step 2: Joint Reinforcement with NoSeep-2

- After **NoSeep-1** has dried completely, apply **NoSeep-2** using a brush at all junctions, joints, and cracks.
- Apply **NoSeep-2** to a minimum of 150 mm on the vertical surface and 150 mm on the horizontal surface at all corners and periphery joints.
- While the coating is still wet, embed 45 GSM nylon mesh properly.
- Ensure the mesh is fully encapsulated without wrinkles, air pockets, or exposure.
- Apply a second coat of **NoSeep-2** over the mesh.
- Allow the treated areas to dry for 8 to 10 hours.



Step 3: Full Surface Waterproofing with NoSeep-2

- Apply **NoSeep-2** uniformly across the entire horizontal surface using a roller.
- Ensure complete coverage over joints, corners, and mesh-reinforced areas.
- Allow the material to stand for 5 to 10 minutes, then swipe off excess material to obtain a smooth, uniform finish.
- Apply a second coat of **NoSeep-2**, maintaining a gap of 8 to 10 hours between coats.
- Ensure a seamless and continuous waterproofing membrane.



Precautions

- Ensure the surface is clean, dry, and free from dust, oil, grease, or loose particles before application.
- Do not apply during rain, standing water conditions, or extreme heat.
- Avoid application if rain is expected within 24 hours of coating.
- Maintain recommended drying intervals between coats.
- Do not dilute the material unless specifically recommended.
- Protect the treated surface from foot traffic, mechanical damage, and water exposure during curing.
- **DO THE PONDING TEST FOR 96 HOURS AFTER FOUR DAYS OF DRYING.**
- **REPAIRING, IF ANY MUST BE CARRIED OUT AFTER DRYING THE SURFACE COMPLETELY**





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