Inno-Mobility

Pioneering India's First Metro Retrofitment Ecosystem

Case Study: DMRC RS1 Mid-Life Overhaul & Asset Life Extension

A Blueprint for Breaking OEM Monopolies through Localized MRO.

The Obsolescence Trap: Aging Fleets vs. OEM Monopolies

The Scale

Delhi Metro Rail Corporation (DMRC) is India's 2nd oldest and largest metro organization, operating 350 km of routes.

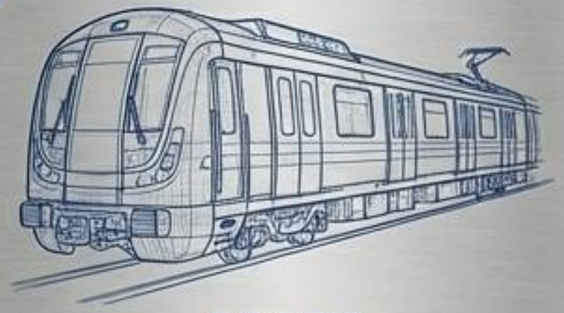
The Critical Threat

The initial RS1 trainsets built by the MRM Consortium (Mitsubishi, Hyundai Rotem) entered commercial service in 2002. At 19 years old, they have exceeded their mid-life cycle.

OEMs are reluctant to support these legacy systems, and the cost of intervention is astronomically high. Meanwhile, India possessed zero domestic Maintenance, Repair, and Overhaul (MRO) capability to address the impending crisis.

The Strategic Intervention: DMRC Refurbishment Contract

1



SCOPE

Partial refurbishment of 10 Trainsets (~60 Cars).

2

VELOCITY

1-Month turnaround time for a complete trainset (4-6 cars).

3

ECONOMICS

Targeted Total Contract Value (TCV) of **~$1M** per trainset **($250K per car)** — a fraction of OEM replacement costs.

Division of Responsibilities

Client Facilitation (DMRC)

Train sets as per overhaul schedule | Depot space with E&M access | Office & Storage space | Electricity

Execution Engine

Inno-Mobility & Consortium

Turnkey Refurbishment Delivery

Anatomy of Obsolescence: Diagnostics & Interventions (Phase 1)

Diagnostic Matrix

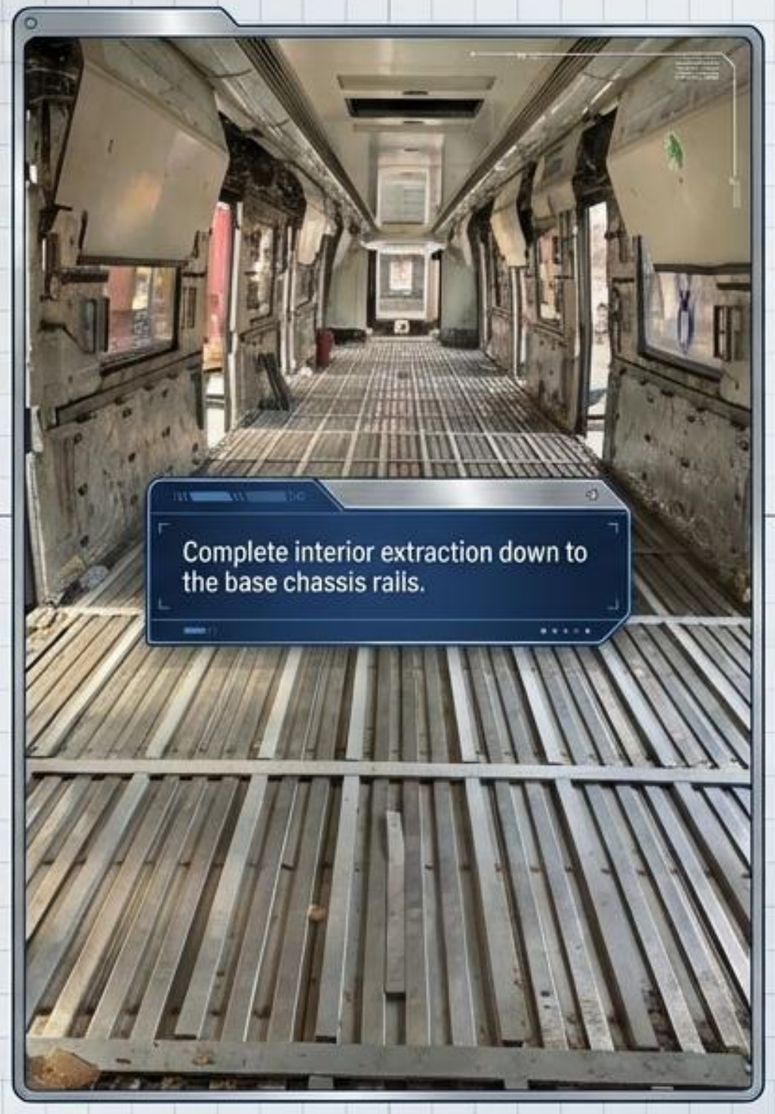
EVIDENCE		
	**Exterior Degradation** **Condition:** Outer panels structurally sound, but paint/color fading causes contrasting textures between car body and doors.	**INTERVENTION** ✓ **Intervention:** Precision color-matching, repainting, and specialized markings overhaul.
	**Operator Cab Degradation** **Condition:** Severely worn out FRP (Fiber-Reinforced Plastic) panels and surfaces in the Driver Cab.	**INTERVENTION** ✓ **Intervention:** Comprehensive interior FRP panel restoration and surface repainting to restore optimal operator environment.

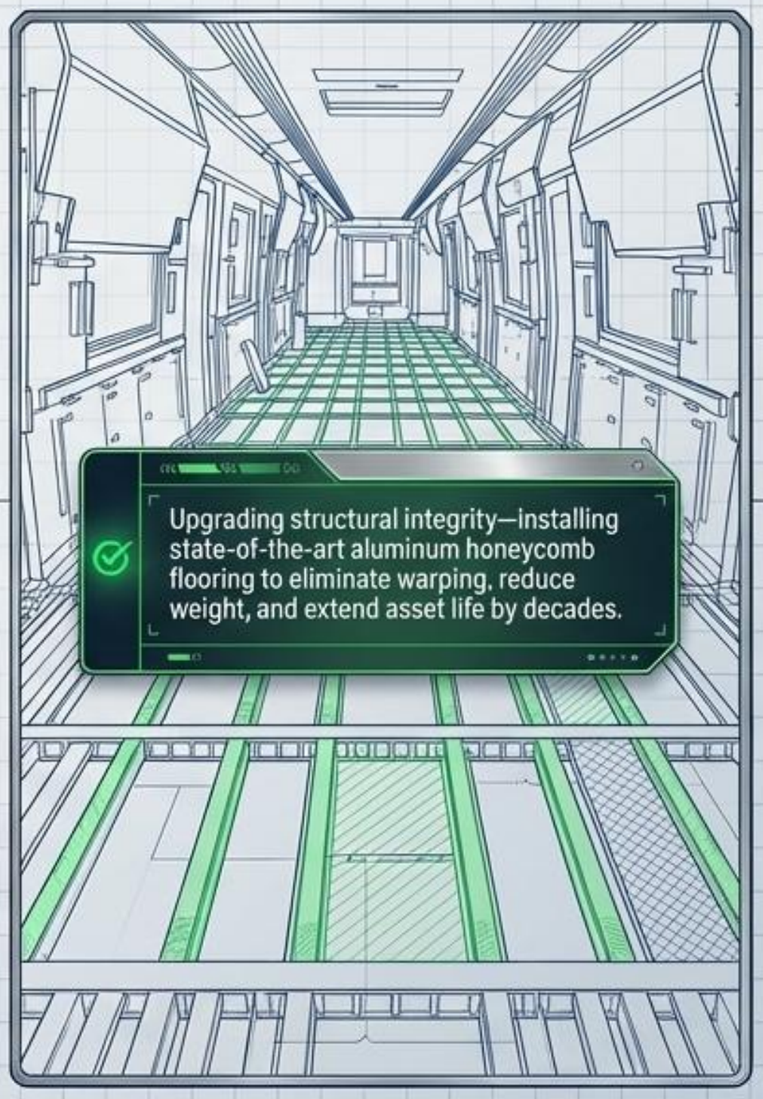
Anatomy of Obsolescence: Diagnostics & Interventions (Phase 2)

Diagnostic Matrix

EVIDENCE	INTERVENTION
 **Condition:** Faulty and worn-out relays and relay control panels posing operational risks.	**Intervention:** Complete tear-out and replacement of relay panels using newly mapped wiring details.
 **Condition:** Original wooden flooring has become severely uneven, trapping air-bubbles and lacking modern structural integrity.	**Intervention:** Full-depth floor extraction and replacement with modern materials (detailed next).

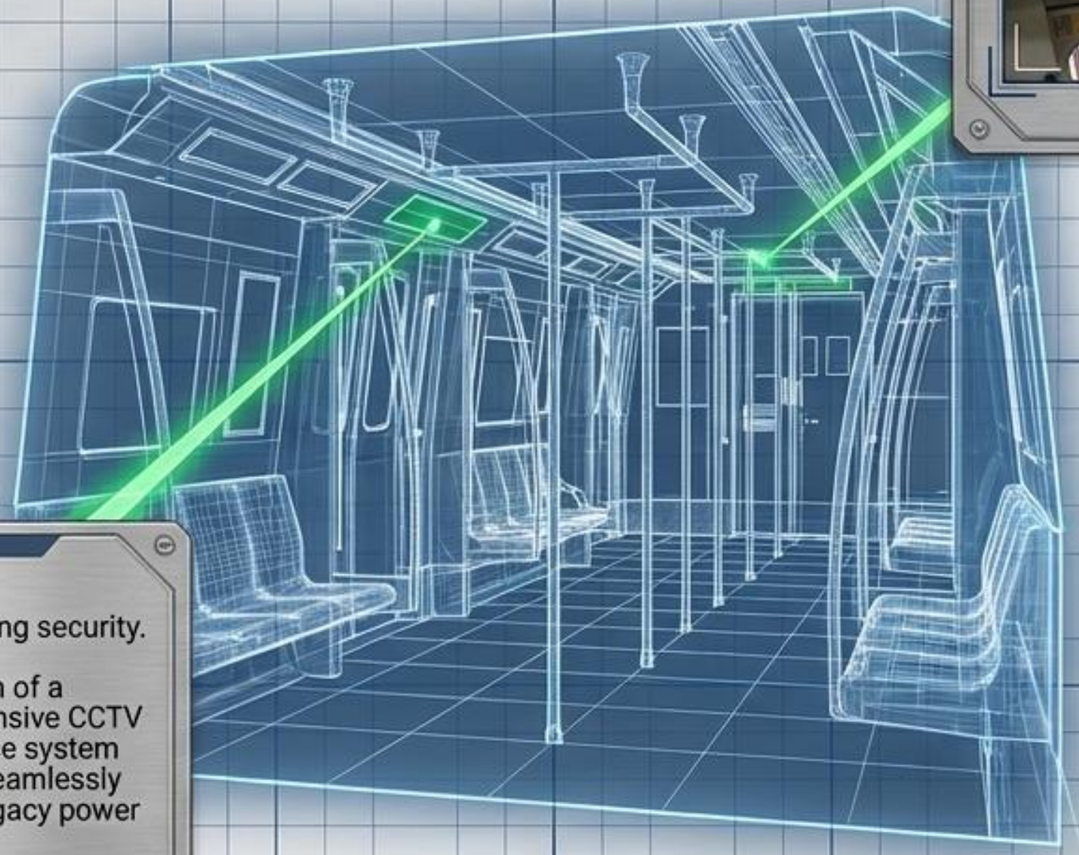
Structural Teardown: The ‘Skin to Skeleton’ Retrofit





System Modernization:
Analog Architecture to Smart Transit

Replacing static, printed information boards with an integrated Dynamic Route Map (DRM) display system, synchronized with the existing PA/PIS infrastructure.



Zero existing security.

Installation of a comprehensive CCTV surveillance system mapped seamlessly into the legacy power grid.

The Execution Track: From Concept to Mobilization

Sep-Oct 2019

Deep-dive system review and diagnostic evaluation from project inception.

Nov 2019 - Mar 2020

International capability secured. Naledi Rail Engineering (RSA) officially onboarded as the strategic execution partner.

Jun-Sep 2020

Techno-commercial bid formally submitted to DMRC.

Feb 2021

Bid officially awarded. The localized MRO concept is validated.

Mar-Aug 2021

Physical mobilization begins. The first trainset is received at the overhaul shed, and immediate retrofit work commences.

Repair, Overhaul, Testing & Commissioning of RS1 Trainsets of Delhi Metro Rail Corporation (DMRC)

TECHNO-COMMERCIAL PROPOSAL BRIEF

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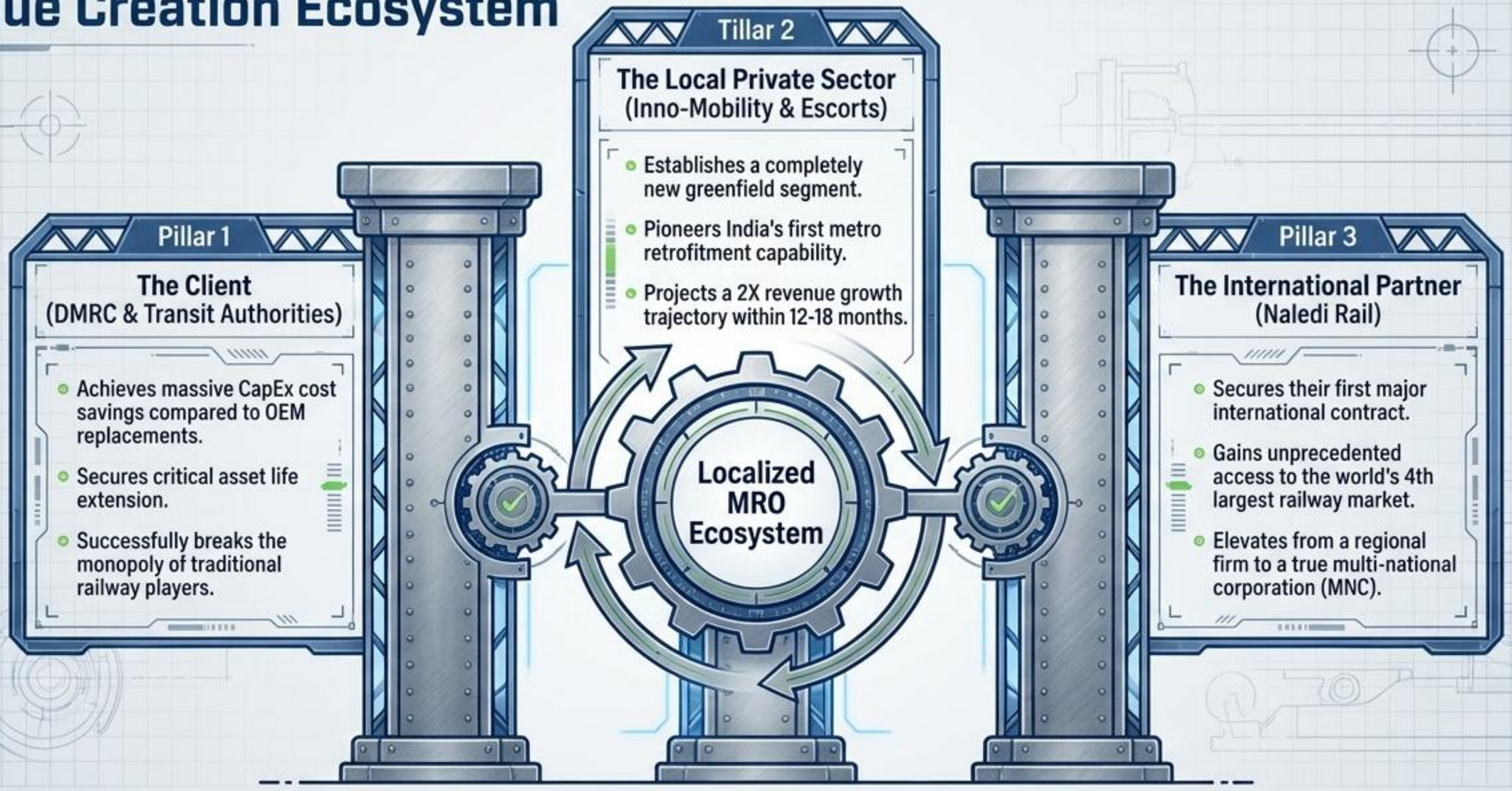
OCT 2019

The Catalyst: A Tri-Partite Value Creation Ecosystem



Global Scalability: Deploying the MRO Blueprint

The DMRC RS1 project proves that a plug-and-play MRO structure with minimal overhead can deliver world-class transit interventions. This creates a wider playing field, greater market access, and a highly secured, trusted support network.

International Expansion

Adapting the blueprint for customized luxury passenger rail cars in Southeast Asia—delivering premium quality at highly disruptive, non-European costs.

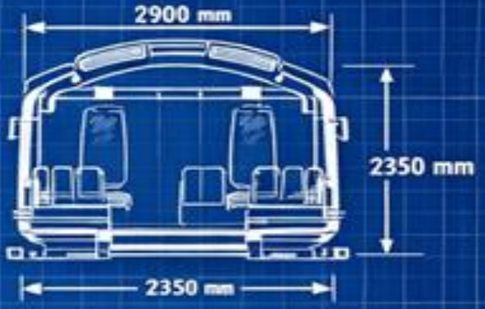
Domestic Growth

Leveraging the established reverse-integration ecosystem to develop highly competitive new Mass Rapid Transit Systems (MRTS) and Light Rail solutions specifically engineered for the expanding Indian market.

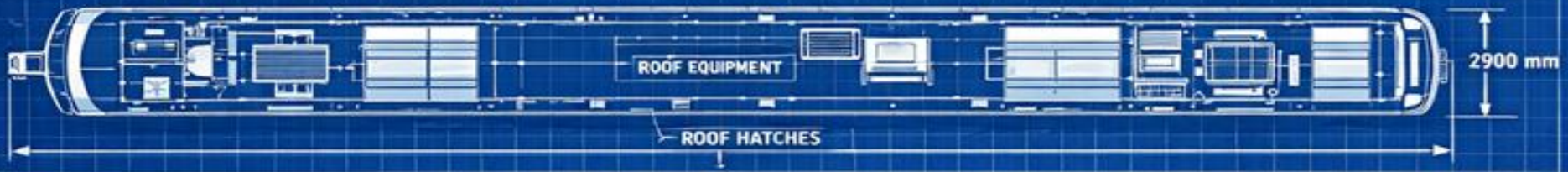
DELHI METRO RAIL SYSTEM

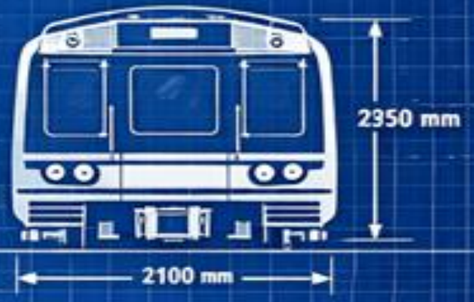
SIDE ELEVATION - SCALE 1 : 50

SECTION DETAILS



TOP VIEW - SCALE 1:50





FRONT VIEW - SCALE 1:50

REAR VIEW - SCALE 1:50

TECHNICAL SPECIFICATIONS

- TRACK GAUGE: 1435 mm (STANDARD GAUGE)
- POWER SUPPLY: 35 KV AC OVERHEAD
- MAX SPEED : 80 KM/H
- CAPACITY : 300 PASSENGERS (APPROX)
- TRAIN CONFIGURATION: 4 TO 8 CARS

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