RKC
INTELLIGENT ENGINEERING

R K CHAVAN INFRASTRUCTURE PVT. LTD. PUNE

UHPC Contractor’s Perspective

ABOUT RKC

From its inception in 1995. RKC's principal role is to devise engineering strategies to create competitive advantage and drive industry-wide innovation. Owing to its DNA of dynamic execution , intelligent engineering and safety management.

We empower our clients with years of expertise in

- Engineering, procurement and construction
- Highway and pavement engineering
- Structural Engineering
- Mining and logistics
- Major engineering execution

INFRASTRUCTURE INDIA

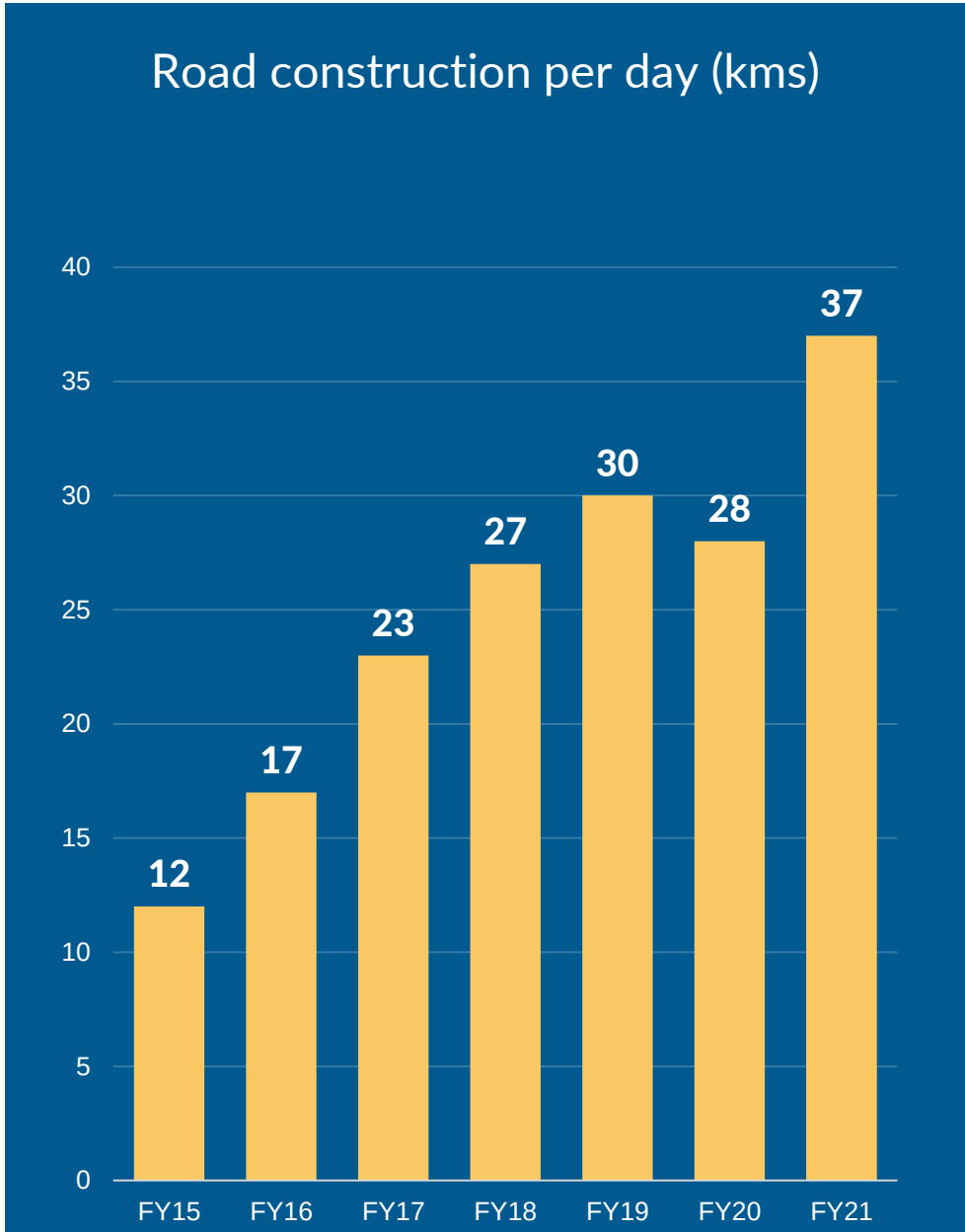
Strong Momentum in Road Construction

By **2024**, the Ministry of Road Transport and Highways wants to build **60,000 kms** of world-class national highways at a rat of **40 kms** each day.

Rs. 1,99,107.71 crore (US$ 26.02 billion) has been allocated towards road transport and highway.

India is expected to become the third-largest construction market globally by **2022**.

India has a requirement of investment worth Rs. **50 trillion (US$ 777.73 billion)** across infrastructure by **2022** for a sustainable development in the country.



WHAT IS UHPFRC ?

Ultra high-performance fiber reinforced concrete

Concrete Grade
150/165 above

1

100 times more durable than conventional concrete

2

4-6 times stronger than normal concrete (in compressive strength)

3

With usable structural ultimate tensile strength **(> 8 MPa)** and ultimate flexural strength more than **30 MPa.**

4

Longer service and design life

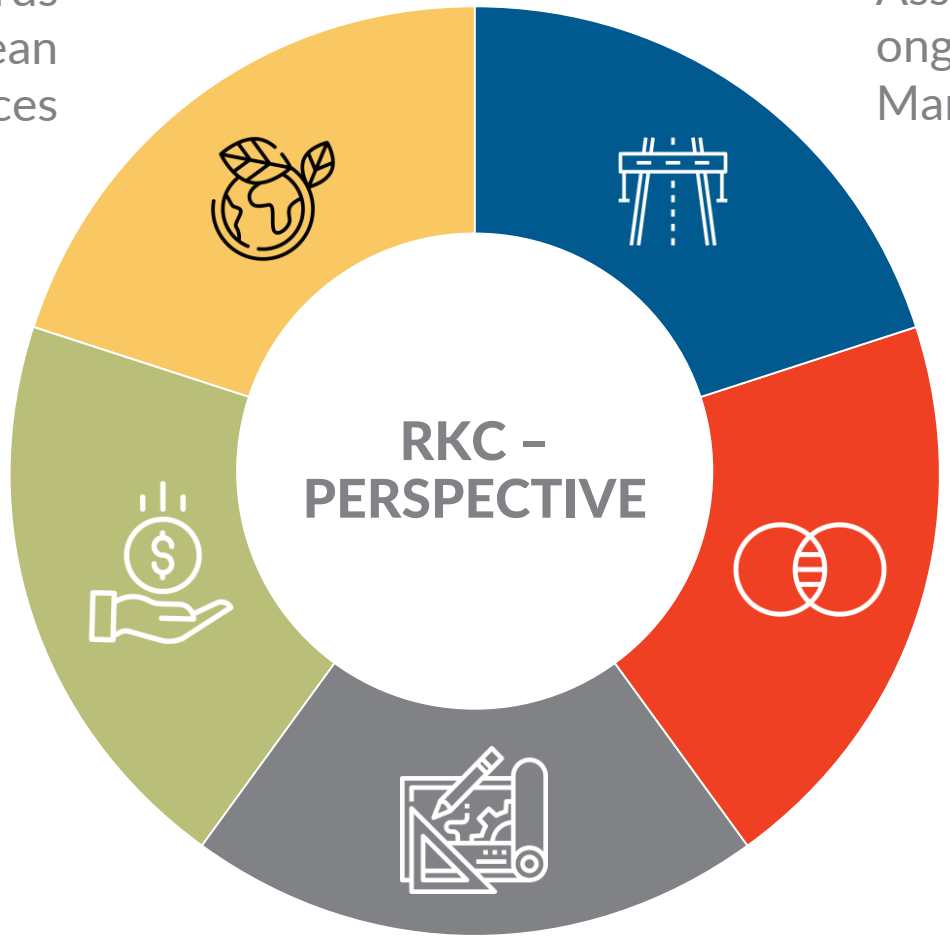
5

Lower carbon footprint

6

A Step forward towards sustainable and lean construction practices

Assessment of UHPC in ongoing project – NHAI Palkhi Marg Package – IV



Cost Evaluation

Comparison with Conventional Methodology

Conventional Method Design Vs UHPC Design

ASSESSMENT OF UHPC IN ONGOING PROJECT

Project: NHAI Palkhi Marg Pkg-IV, (Structures – 43 Nos)

1
MNB
23 Nos (823m)

2
MJB
2 Nos (205m)

3
LVUP
10 Nos (120m)

4
VUP
8 Nos (160m)

After detailed assessment we came to the conclusion that adaptation of UHPC is beneficial for longer span structures as compared to small structures.
We finalized 09 nos structures includes 2 MJB & 6 MNB & 1 VUP

COMPARISON WITH CONVENTIONAL METHODOLOGY

Reduction in number of foundations

Speedy construction (20% fast compared with conventional)

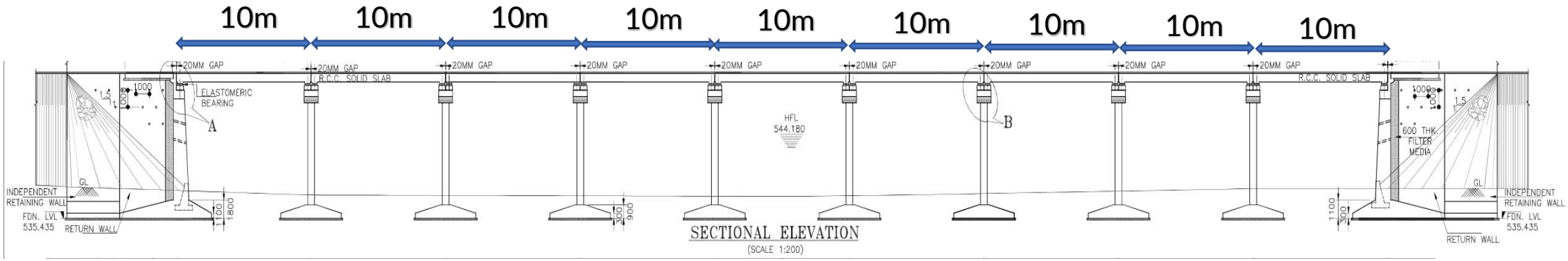
Sustainable – eliminates aggregates & steel

Ease of execution in water streams

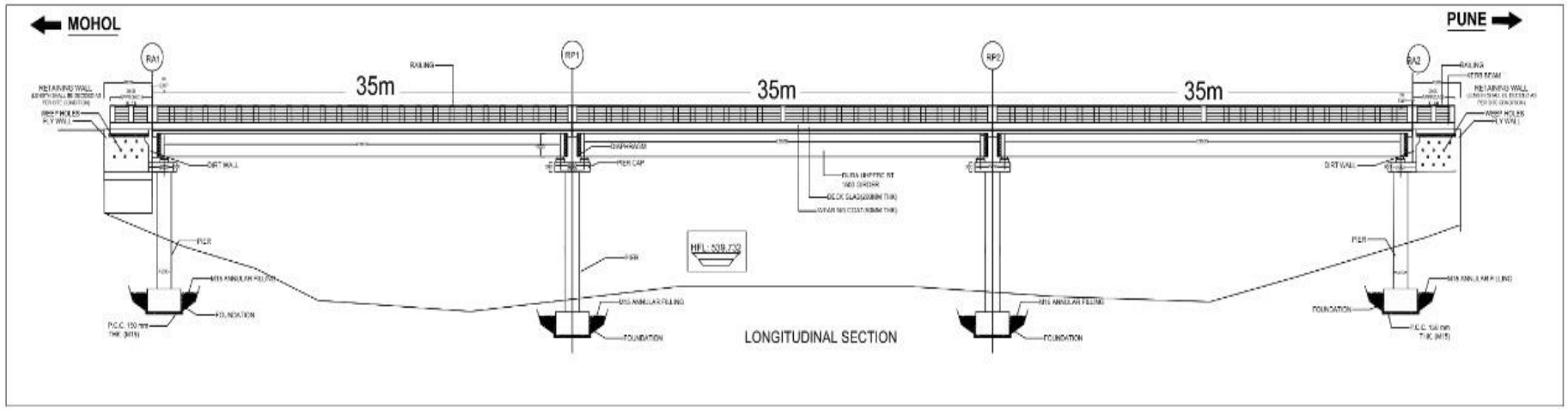
Light weight superstructure enabling ease in launching

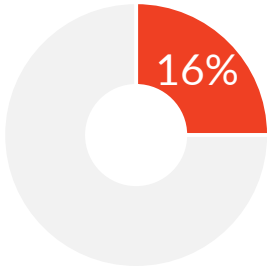
Durable than conventional concrete

CONVENTIONAL METHOD DESIGN VS UHPC DESIGN



Conventional Method design (9 Span of 10m = 90m)

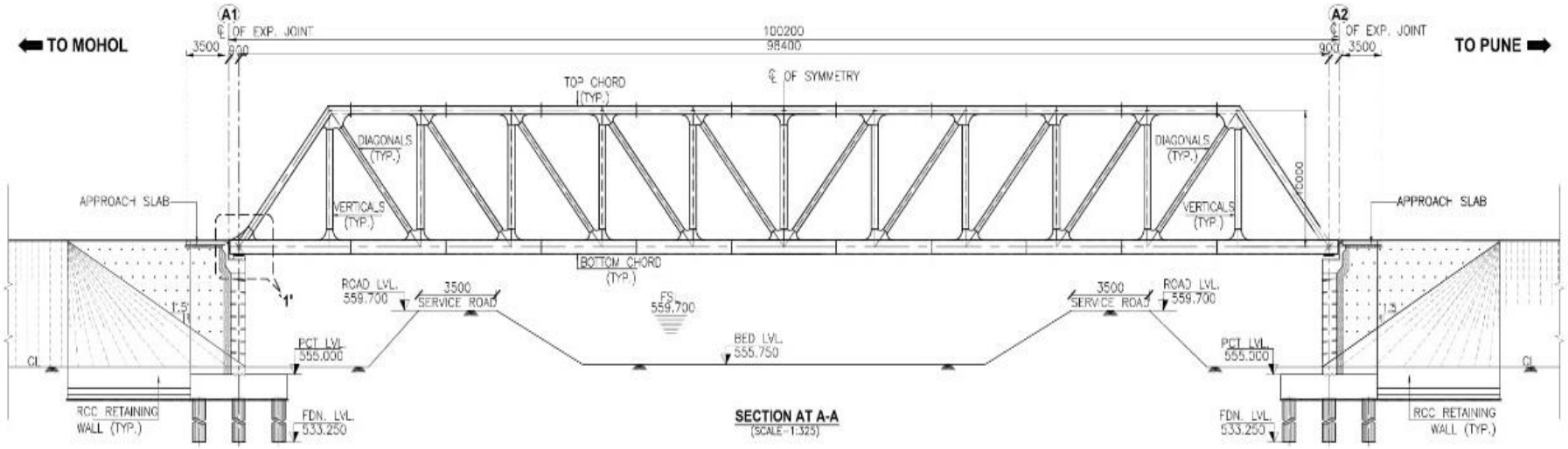




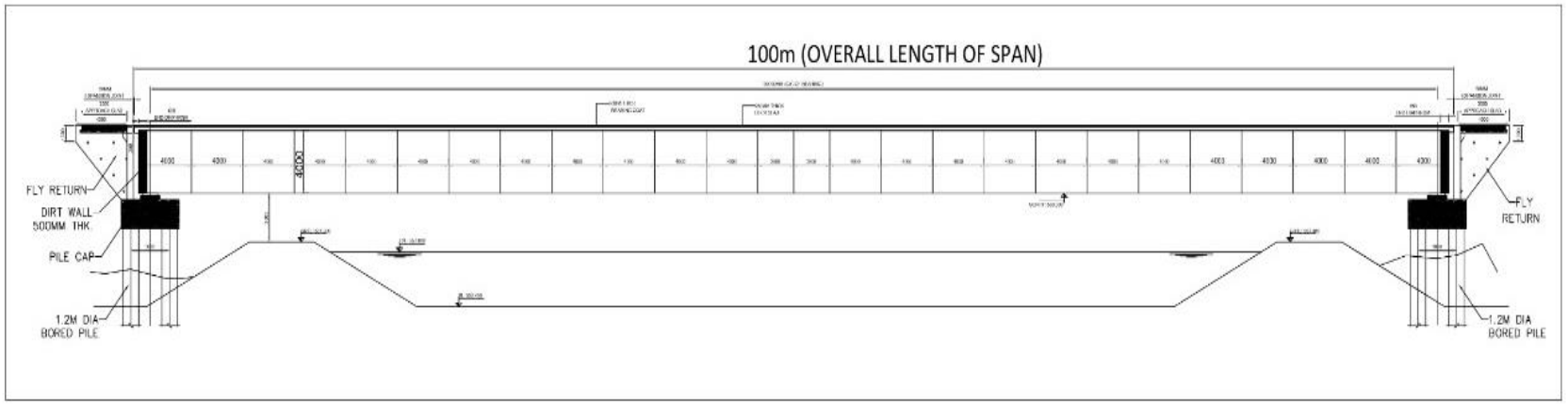
Cost Saving in %

UHPC design (3 Span of 35m = 105m)

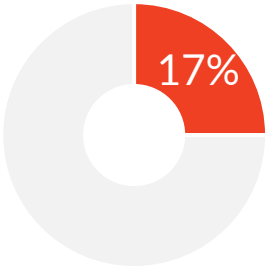
CONVENTIONAL METHOD DESIGN VS UHPC DESIGN



Conventional Method design (1 Span of 100m = 100m)

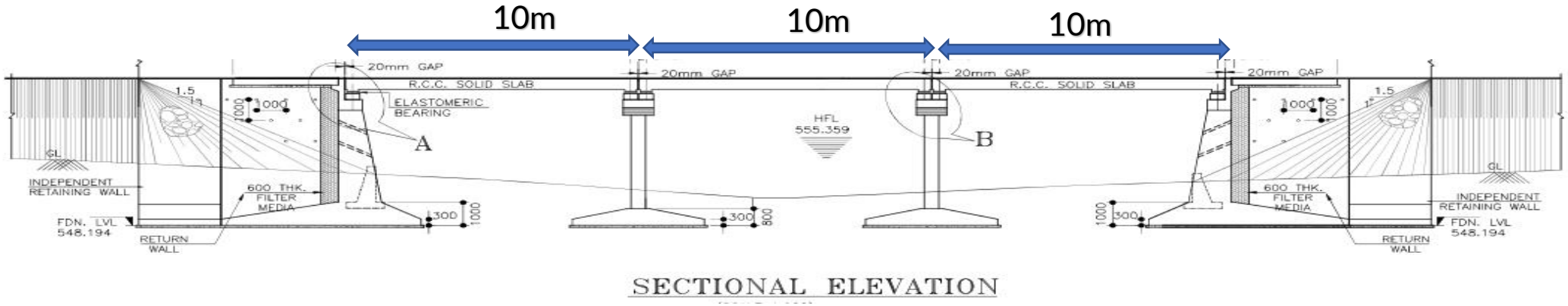


UHPC design (1 Span of 100m = 100m)

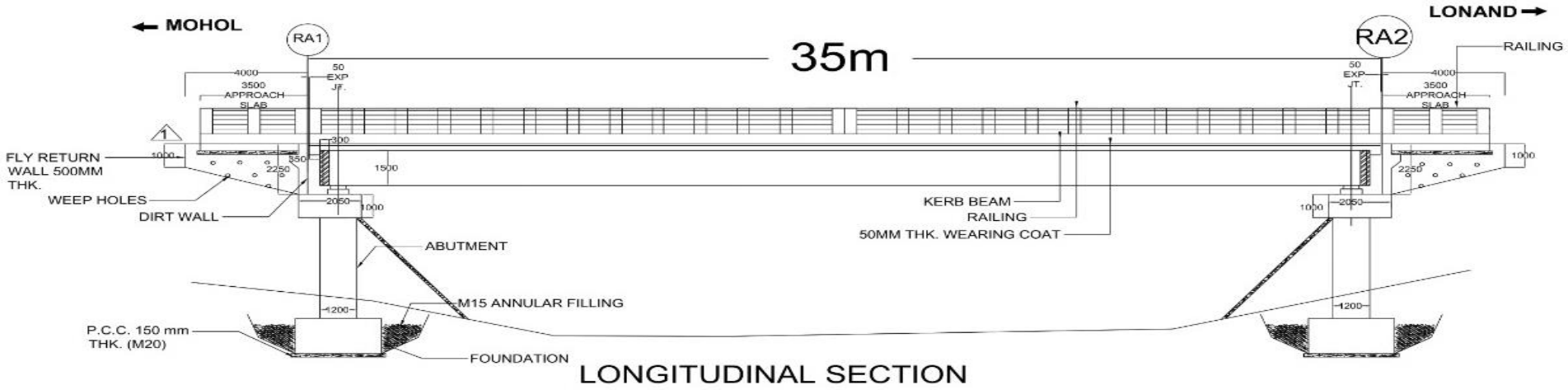


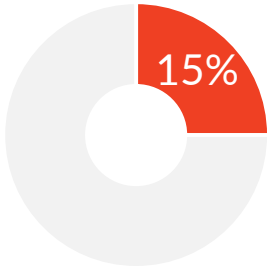
Cost Saving in %

CONVENTIONAL METHOD DESIGN VS UHPC DESIGN



Conventional Method design (3 Span of 10m = 30m)

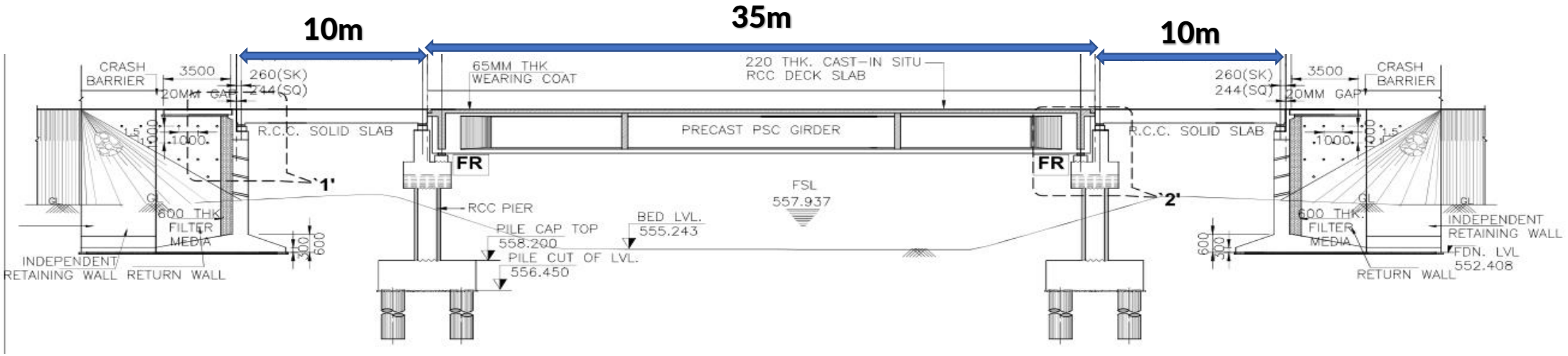




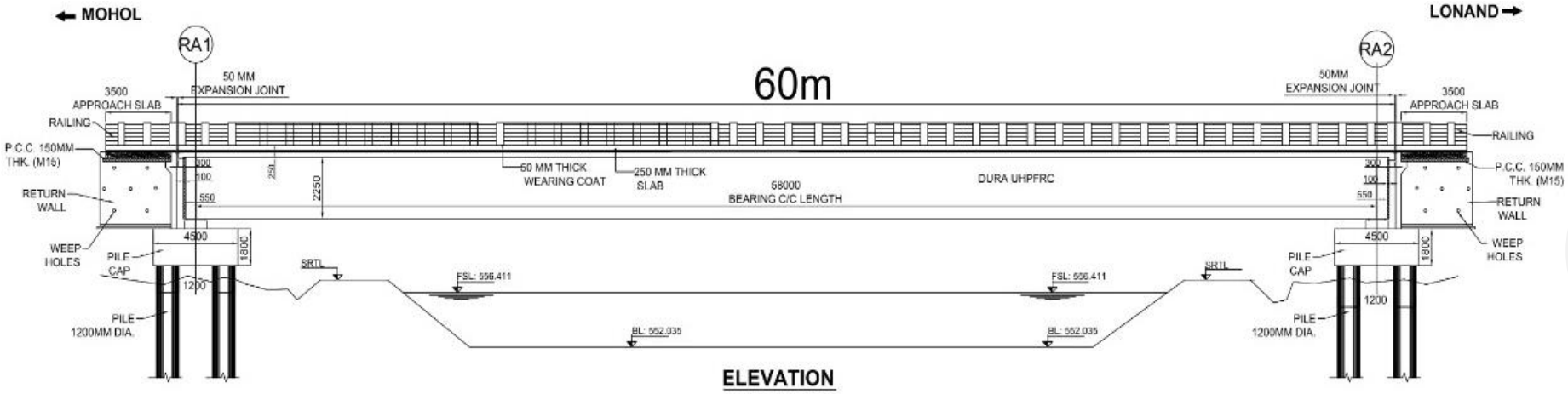
Cost Saving in %

UHPC design (1 Span of 35m = 35m)

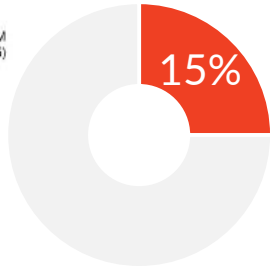
CONVENTIONAL METHOD DESIGN VS UHPC DESIGN



Conventional Method design (3 Span of 10+35+10 = 55m)



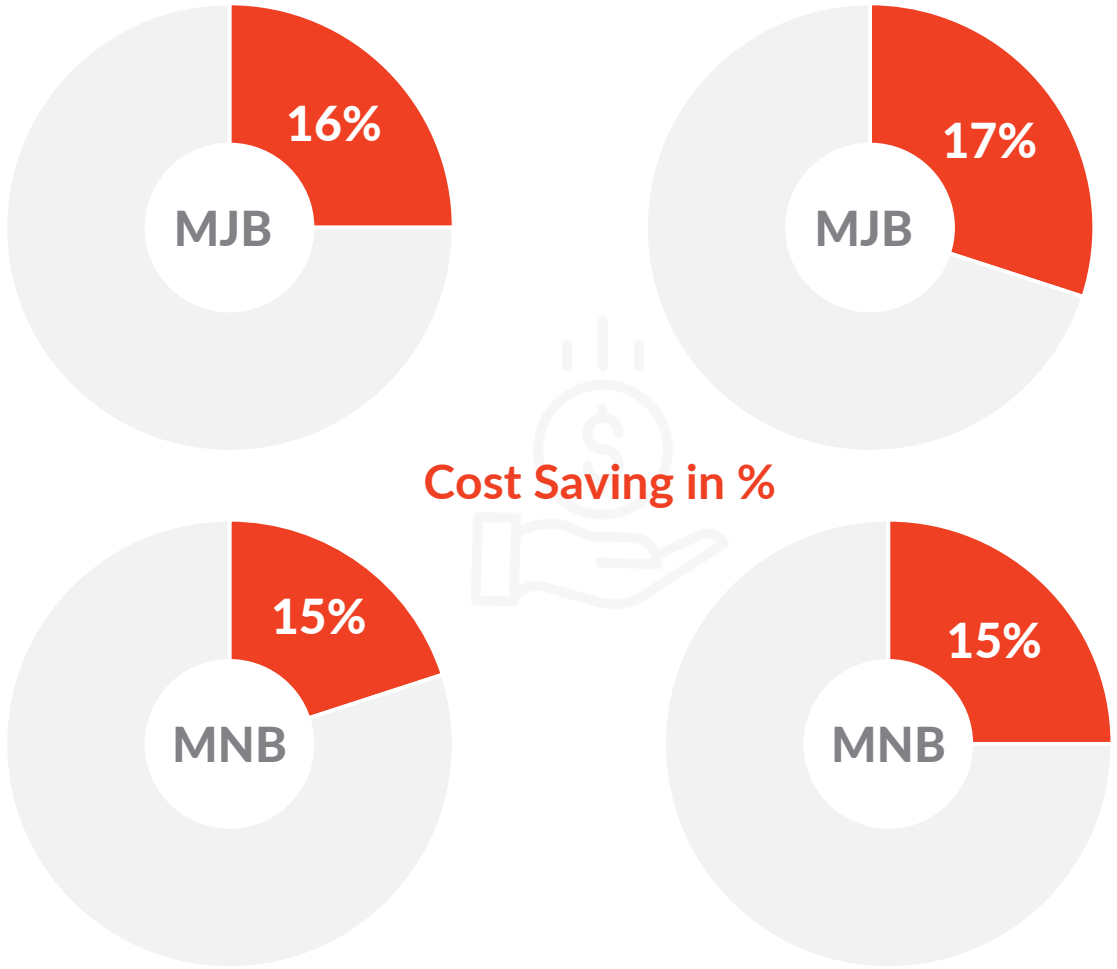
UHPC design (1 Span of 60m = 60m)



Cost Saving in %

COST EVALUATION

Sr No	Structure Type	Span Arrangement	
		As Per Conventional	As per UHPC
1	MJB	9 X 10m	3 X 35m
2	MJB	1 X 100.0m	1 X 100.0m
3	MNB	3 X 10m	1 X 35m
4	MNB	10 + 35 + 10	1 X 60m



ADVANTAGES / CHALLENGES OF UHPC

Advantages

- Cost efficient
- Reduce foundation cost
- Sustainable product
- Lighter and thin sections
- Better bridge material compared to conventional
- Easier handling, transporting & launching (lower tonnage crane required)
- Shortened construction period
- Lower carbon footprint - at NHAI Palkhi Marg PKG- IV, we are saving over 6000 tonnes of carbon emission

Challenges

- Quality Control
- Dependency on manufacturer
- Availability of raw materials i.e., silica sand and steel fibre etc.
- Lack of innovative mandates for early adoption
- Change mindset

A WAY FORWARD

- Good Initiative by MORT&H by conducting the workshops
- Frequent steps to promote New Technology efficiency and awareness

The Government of India aims to construct **65,000** kms of national highways at a cost of **Rs. 5.35 lakh crore (US$ 741.51 billion)** by **2022**.

INNOVATION

Through innovation let's say if we save **5%;** the amount saved will be staggering **Rs 16, 000 Crores**

With innovation ahead India will definitely achieve 100 Kms per day in coming years.


“THERE’S A WAY TO DO IT BETTER –
FIND IT."
- Thomas Edison

RKC
INTELLIGENT ENGINEERING

THANK YOU

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