

# A ONE-DAY NATIONAL WORKSHOP ON DURABILITY OF CONCRETE

*By*

RASTA-ICI-BENC

Date- 25.04.2023



# ABOUT THE GROUP...



**JSW Steel**

India's leading integrated steel producer with 27MTPA steel capacity Growing up to 35 MTPA



**JSW Energy**

Serves the entire energy value chain with a total capacity of 4600 MW growing upto 10000 MW



**JSW Cement**

Manufacturer of 'Portland Slag Cement' and 'GGBS' with capacity of 17 MTPA Growing up to 25 MTPA



**JSW Infrastructure JSW Paints**

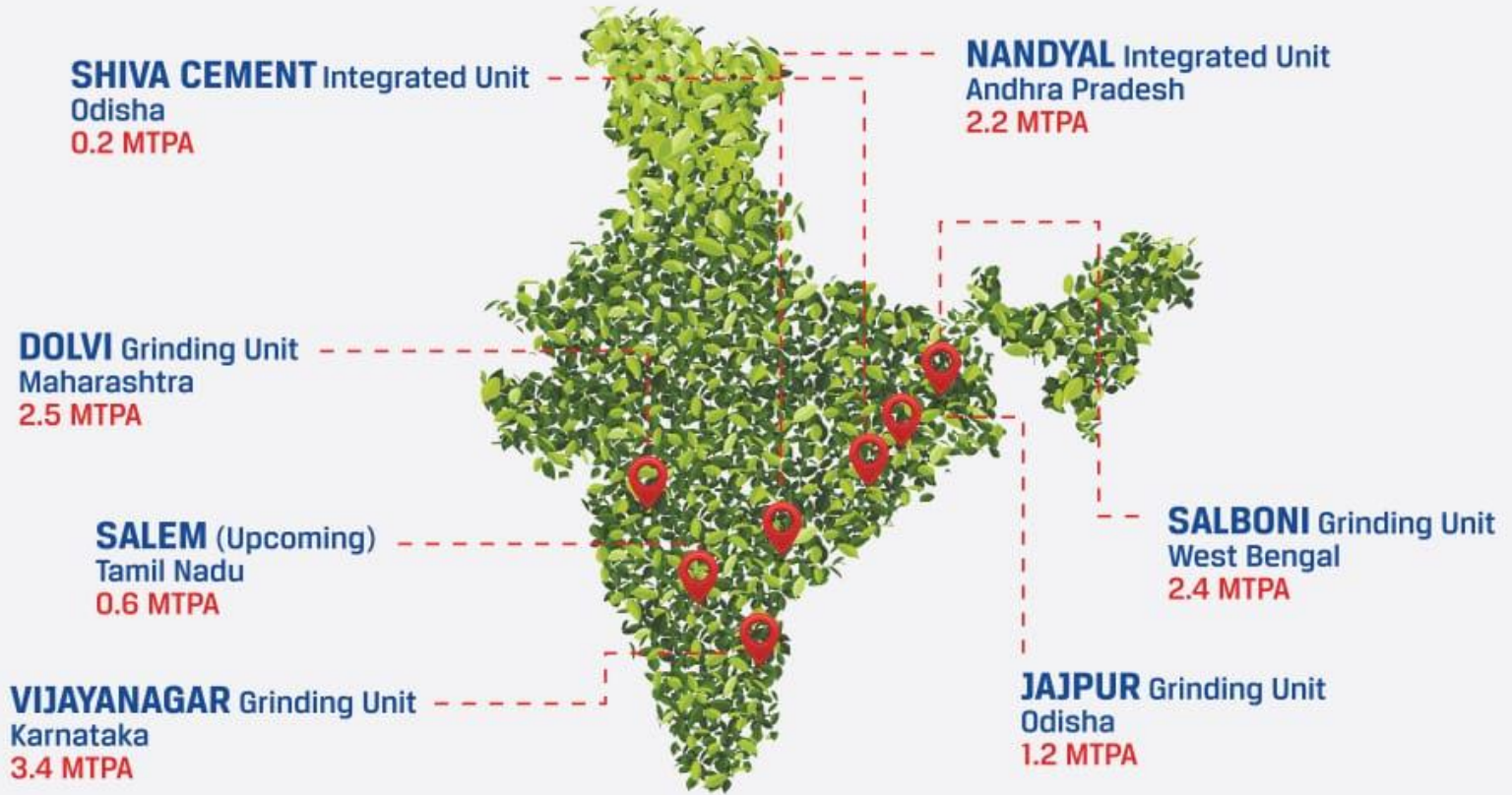
Operates environment friendly seaports & terminals with capacity of 70 MTPA



Launched in 2019 both in Decorative and Industrial Paints Segment .Fastest growing



# OUR CEMENT MANUFACTURING FACILITIES ACROSS INDIA



# JSW Cement : Product Portfolio

Green Products

## Blended Cement

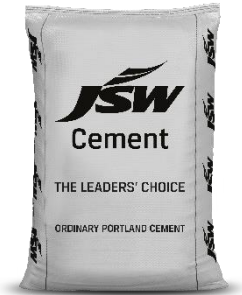
## GGBS

## Ordinary Portland Cement

### Slag Cement

### Composite Cement

Core Product Range



Relevant BIS Standard

IS 455-2015

IS:16415-2015

IS 16714-2018

IS 269:2015

Allied Products



### Construction Chemicals



### Ready-mix concrete



### Slag sand

# JSW Cement Ltd- Green Product Range

Cement  
Fine Aggregates  
Dry Mix Mortar  
Integral Water Proofing  
Admixture  
Floor Hardeners



Cementitious



Ready Mix Concrete





We have the lowest Carbon footprint among the Cement operation in the world at 298 kg/t of cementitious material.

By reducing the emission of Green House Gases & producing sustainable products, we are working on building a greener future.

[#JSWCement](#) [#TheLeadersChoice](#)  
[#GreenCement](#)

# GreenPro Certifications by CII- IGBC & Environmental Product Declaration Certification

## ENVIRONMENTAL PRODUCT DECLARATION OF AVERAGE PSC CEMENT



ISO 14020:2006, ISO 14025:2006, ISO 14040:2006, EN 14044:2006, EN 15804:2012, EN 16908:2017



EPD registration number: S-P-01414  
Publication date: 2019-10-11  
Validity date: 2024-10-10  
Geographical scope: India



Confederation of Indian Industry

### CII-Green Products and Services Council

hereby certifies that

**Portland Slag Cement**

(GPISW15001)

Manufactured by JSW Cement Ltd  
the requirements of GreenPro Certification

This certification is valid till **December 2023**

Jamshyd N Godrej  
Chairman, CII-Godrej GBC

Parasu R  
Chairman, CII-Green Products & Services Council

Supporting Council



Confederation of Indian Industry

### CII-Green Products and Services Council

hereby certifies that

**Ground Granulated Blast Furnace Slag (GGBS)**

(GPISW26002)

Manufactured by JSW Cement Ltd - GGBS Division at Dolvi, Maharashtra meets  
the requirements of GreenPro Certification and qualifies as Green Product.

This certification is valid till **December 2023**

Jamshyd N Godrej  
Chairman, CII-Godrej GBC

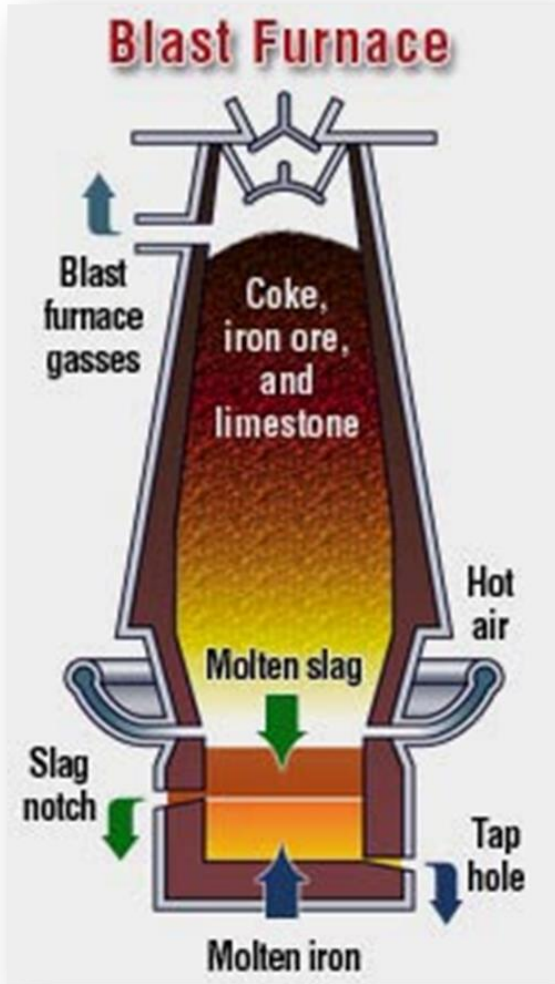
Parasu Raman R  
Chairman, CII-Green Products & Services Council

K S Venkatagiri  
Executive Director, CII-Godrej GBC

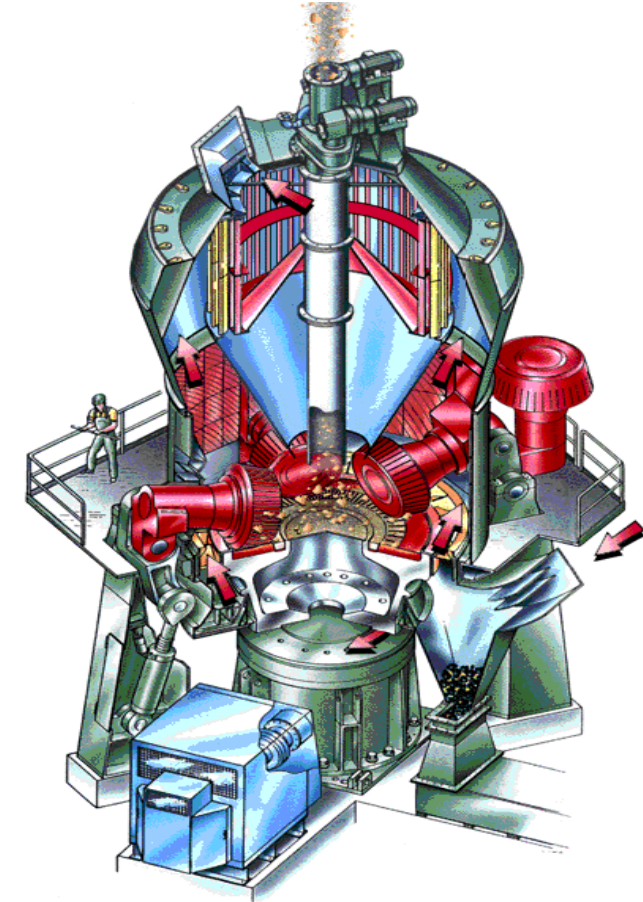
Supporting Council and programmes



# GROUND GRANULATED BLAST FURNACE SLAG



- Granulated Blast Furnace Slag is obtained by rapidly chilling (quenching) the molten Slag from the furnace with the help of water. During this process, the slag gets fragmented and transformed into amorphous granules (glass), meeting the requirement of IS 12089:1987 (manufacturing specification for granulated slag used in Portland Slag Cement). The granulated slag is ground to desired fineness for producing GGBS.
- Non metallic product.
- Consisting of glass containing silicates and aluminates of lime.
- Developed simultaneously with iron in blast furnace.
- Obtained by rapidly chilling or quenching with water or steam and air.





# ADVANTAGES OF CONCRETE WITH PSC



Green Product and Concrete made with using Eco Friendly Cementitious Material

High Resistance to Chlorides & Sulphates

Reduction in Heat of Hydration : Highly recommended for reducing Core vs Surface Temperature Gradient.

Improved Ultimate Strength. In case of Concrete Pavements, improvement in Flexural Strength is observed.

Particle Packing Effect : Dispersion of Cement Particles

Improved Resistance to Corrosion.

Improved Water Impermeability

# PSC ADVANTAGES OVER PPC

GGBS and Fly Ash are used as a replacement for a portion of the Portland cement.

PSC allows 25-70% GGBS replacement as per IS 455

PPC allows 15-35% Fly Ash replacement as per IS 1489

*“Slag is the co-product of a controlled process of iron production, which results in a very uniform composition from source to source”.*

Oxides	Cement Clinker (%)	GGBS (%)	Fly Ash (%)
CaO	62	40	>2
SiO <sub>2</sub>	22	35	55
Al <sub>2</sub> O <sub>3</sub>	5	14	30
MgO	3	8	<1
Fe <sub>2</sub> O <sub>3</sub>	4	0.5	6

# Irrigation & CAD (Reforms) Department- Govt. of AP

**PSC Approval**

GOVERNMENT OF ANDHRA PRADESH  
ABSTRACT

I&CAD Deptt. - Usage of Portland Slag Cement in all Engineering Departmental works - Approved - Orders - Issued.

IRRIGATION AND CAD (REFORMS) DEPARTMENT

G.O.Ms.No.47. Dated: 18-09-2014.

Read the following:-

- 1) From the Associated Vice President, Marketing, M/s.JSW Cement Limited, Secunderabad, dated:Nil.
- 2) Govt.Memo.No.2286/Reforms/A1/2013, dated:30.01.2013.
- 3) From the E.N.C.(IW), Hyd., Lr.No.ENC/IW/P&M/EE.I/DEE.B/61108/08/V, dt:14.05.2013.
- 4) Govt.Memo.No.2286/Reforms /A1/2013, dated:10.07.2013.
- 5) From the E.N.C.(IW), Hyd., Lr.No.ENC/IW/P&M/EE.I/DEE.B/61108/V, dated:02.12.2013.
- 6) Govt.Memo.No.2286/Reforms/A1/2013, dated:25.02.2014.
- 7) From the E.N.C.(IW) & Chairman, BOCEs, Hyd., Lr.No.ENC/IW/P&M/EE.I/DEE.B/61108/08/V, dated:06.05.2014.

>><<

**ORDER:**

In the reference 1<sup>st</sup> read above, M/s.JSW Cement Limited have represented to the Government for use of Portland Slag Cement (PSC) in Departmental works, which is being used by other Government Departments.

2. In the reference 2<sup>nd</sup> and 4<sup>th</sup> read above, a report has been called for from the Engineer-in-Chief(IW), Hyderabad for its usage by all Departmental works, duly comparing the cost of Portland Slag Cement with the cost of other Cements and its market share Vis-à-vis with other cements.

3. In the reference 3<sup>rd</sup> and 5<sup>th</sup> read above, the Engineer-in-Chief(IW), Hyderabad has submitted the proposals for the use of Portland Slag Cement by all the Departments because of its superior Engineering properties and other advantages like 1) Higher strength over a period of time, 2) Better workability, 3) Most Environment friendly, 4) Max. Raduction in heat of hydration, 5) High ultimate strength, 6) High Impermeability, 7) Excellent resistance to Chloride penetration, 8) Excellent resistance to Sulphate attacks, 9) Low risk of Cracking, 10) Savings in cost of Concrete and most importantly it is suitable for severe exposure conditions. Issue was discussed by him in the Committee of Board of Chief Engineers and also comparison of cost of Portland Slag Cement with the cost of other cements and submitted proposals to the Government for consideration of Portland Slag Cement with **BIS certificate mark license** as per **IS 455-1989** (i.e. Specification covering the manufacturing and Chemical & Physical requirements for Portland Slag Cement) and recommended for use in all Engineering Departments because of its advantages stated above. The TR&B Department has also confirmed the rates of Cement in accordance with the orders issued in G.O.Rt.No.882, TR&B(R.1) Deptt., dated:10.09.2013, G.O.Rt.No.963, TR&B(R.1)Deptt., dated:17.10.2013 and G.O.Rt.No.1135, TR&B(R.1)Deptt., dt:14.11.2013.

P.T.O.,

1468  
31.10.14

Office of the Chief Engineer  
Irrigation & CAD  
Government of Andhra Pradesh

TA  
30/10/14

AEI  
30/10/14

DESPATCHED

:: 2 ::

4. Government after careful examination of the proposal of the Engineer-in-Chief(IW), Hyderabad hereby accord approval for the use of Portland Slag Cement by all Engineering Departments because of its superior Engineering properties and other advantages like 1) Higher strength over a period of time, 2) Better workability, 3) Most Environment friendly, 4) Maximum Reduction in heat of hydration, 5) High ultimate strength, 6) High Impermeability, 7) Excellent resistance to Chloride penetration, 8) Excellent resistance to Sulphate attacks, 9) Low risk of Cracking, 10) Savings in cost of Concrete and most importantly it is suitable for severe exposure conditions. If any deviation is noticed at a later dates in the Engineering properties and other advantages, the usage of cement shall be dispensed with.

5. The Engineer-in-Chief(IW), Hyderabad shall take necessary action in the matter accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

ADITYA NATH DAS,  
PRINCIPAL SECRETARY TO GOVERNMENT.

To  
All Engineers-in-Chief, I&CAD Department,  
Jalassoudha Buildings, Errum Manzil, Hyderabad.  
All Engineers-in-Chief in all Departments in the State of A.P.

Copy to:  
The TR&B (Roads.1) Department.  
The P.S. to Minister (ICAD&WRM).  
The P.S. to Principal Secretary to Government(AD).  
The Associated Vice President(Mktg.), M/s.JSW Cement Limited, 3<sup>rd</sup> Floor,  
Block-B, Surya Towers, 105, Sardar Patel Road, Secunderabad-500 003.  
SF/SC.

//FORWARDED :: BY ORDER//

SECTION OFFICER.

ENRHT NO. BG/TRM/CE/AES/2014  
dt. 03.11.2014

copy communicated for tki wja.

To  
EES, Nelbva, T. Devala, Vijayawada, Kurnool  
& Visakhapatnam  
CODM to SE/KJA CMCC.

# Irrigation & CAD (Reforms) Department- Govt. of TS

GOVERNMENT OF TELANGANA  
ABSTRACT

I&CAD Deptt. – Usage of Portland Slag Cement in all Engineering Departmental works  
– Approved – Orders – Issued.

IRRIGATION AND CAD (REFORMS) DEPARTMENT

G.O.Rt.No.174

Dated:20-03-2015  
Read the following:

- 1) From the Associated Vice President, Marketing, M/s.JSW Cement Limited, Secunderabad, dated:Nil.
- 2) Govt.Memo.No.2286/Reforms/A1/2013, dated:30.01.2013.
- 3) From the E.N.C.(IW), Hyd., Lr.No.ENC/IW/P&M/EE./DEE.8/ 61108/08/V, dt:14.05.2013.
- 4) Govt.Memo.No.2286/Reforms /A1/2013, dated:10.07.2013.
- 5) From the E.N.C.(IW), Hyd., Lr.No.ENC/IW/P&M/EE./DEE.8/ 61108/V, dated:02.12.2013.
- 6) Govt.Memo.No.2286/Reforms/A1/2013, dated:25.02.2014.
- 7) From the E.N.C.(IW) & Chairman, BOCes, Hyd., Lr.No.ENC/IW/P&M/EE./DEE.8/61108/08/V, dated:06.05.2014
- 8) Govt.Memo.No.2286/Reforms/A1/2013, dated:21-08-2014.
- 9) From the E.N.C.(IW), I&CAD Dept., Hyderabad., Lr.No.ENC/IW/P&M/EE./DEE./ 14, dated:18-02-2015

>><<

ORDER:

In the reference 1<sup>st</sup> read above, Government have received representation for use of Portland Slag Cement (PSC) in Departmental works.

2. In the reference 2<sup>nd</sup> and 4<sup>th</sup> read above a report has been called for from the Engineer-in-Chief(IW), Hyderabad for its usage by all Departmental works, duly comparing the cost of Portland Slag Cement with the cost of other Cements and its market share Vis-à-vis with other cements.

3. In the reference 3<sup>rd</sup>, 5<sup>th</sup> and 7<sup>th</sup> read above, the Engineer-in-Chief(IW), Hyderabad has submitted the proposals for the use of Portland Slag Cement by all the Departments because of its superior Engineering properties and other advantages like 1) Higher strength over a period of time, 2) Better workability, 3) Most Environment friendly, 4) Max. Reduction in heat of hydration, 5) High ultimate strength, 6) High Impermeability, 7) Excellent resistance to Chloride penetration, 8) Excellent resistance to Sulphate attacks, 9) Low risk of Cracking, 10) Savings in cost of Concrete and most importantly it is suitable for severe exposure conditions. The issue was discussed in the Committee of Board of Chief Engineers in its meeting held on 26-04-2013 and he has furnished comparison statement of cost of Portland Slag Cement with the cost of other cements and recommended to the Government for use of any Portland Slag Cement with BIS certificate mark license as per IS 455-1989 (i.e. Specification covering the manufacturing and Chemical & Physical requirements for Portland Slag Cement) in all Engineering Departments because of its advantages stated above. The TR&B Department has also confirmed the rates of Cement in accordance with the orders issued in G.O.Rt.No.882, TR&B(R.U) Deptt. dated:10.09.2013. G.O.Rt.No.963

- 2 -

4. In the reference 8<sup>th</sup> read above, a report has been called for from the Engineer-in-Chief(IW), Hyderabad for confirmation of the Superior Engineering Properties and advantages of PSC and PSC usage in engineering works by an expert from National Council for Cement and Building Materials (NCB), Hyderabad.

5. In the reference 9<sup>th</sup> read above, the Engineer-in-Chief(IW), Hyderabad has submitted the brief report as submitted by the Joint Director, NCB, Delhi covering a brief introduction, advantages, disadvantages and general usage of PSC in Engineering works, wherein stated that Portland Slag Cement is most widely used in concrete application as under:

- Concrete pavements
- Mass concrete application, such as dams
- Pre-stressed or post-tensioned concrete
- High performance/high strength concrete
- Structures and foundation
- Pre-cast concrete, such as pipe and block
- Concrete exposed to sea water and marine application.

6. Government after careful examination of the proposal of the Engineer-in-Chief (IW), Hyderabad for the use of Portland Slag Cement conforming to IS 455-1989, by all Engineering Departments is agreed to. The ENC(IW) I&CAD Department, Hyderabad shall take appropriate steps to use of Portland Slag Cement in specific works only duly ensuring proper quality of material and mixdesign. Further, if any deviation is noticed at a later date in the Engineering properties and other advantages, the usage of Portland Slag Cement shall be dispensed with.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

Dr. SHAILENDRA KUMAR JOSHI  
PRINCIPAL SECRETARY TO GOVERNMENT

To  
All Engineers-in-Chief, I&CAD Department, Jalesoudha Buildings, Errum Manzil, Hyderabad.  
All Engineers-in-Chief in all Departments in the State of Telangana.  
Copy to: The TR&B (Roads.I) Department.  
The (PR&RD) Department  
The P.S. to Minister (Irrigation).  
The P.S. to Principal Secretary to Government,  
The Associated Vice President(Mktg.), M/s.JSW Cement Limited, 7<sup>th</sup> Floor, Block-A, Babukhans, Millenium Center, Somajiguda, Hyderabad-62.  
SF/SC.

//FORWARDED:BY ORDER//

D. D. J.  
SECTION OFFICER

# Public Health & Municipal Engineering Department- Govt. of AP

GOVERNMENT OF ANDHRA PRADESH  
PUBLIC HEALTH AND MUNICIPAL ENGINEERING DEPARTMENT

Office of the Engineer-In-Chief,  
Public Health,  
Tadepalli, Guntur.

C.Memo.No.146 /T4/A4/Cement&Steel/ 2017-18 Dated: 23-03-2017.

Sub: PH & ME Department-Sub-Committee meeting held in the chambers of Engineer-In-Chief (A.W/I.W), Water Resources Department, PWD Ground, Vijayawada on 28.12.2017 to Review and Finalize Cement Rate from January-2017 to December-2017.

Ref: Minutes of Sub-Committee meeting held in the chambers of Engineer-In-Chief (A.W/I.W), Water Resources Department, PWD Ground, Vijayawada on 28.12.2016.

\*\*\*\*\*

It is to inform that the Sub-Committee has finalized the rate of Cement from January-2017 to December-2017 during the meeting held in the chambers of Engineer-in-Chief (A.W/I.W), Water Resources Department, PWD Ground, Vijayawada on 28.12.2016. Hence all Superintending Engineers (PH) are requested to take necessary action in the matter and to communicate the rates to all the Executive Engineers (PH)/Municipal Engineers under their respective jurisdictions for adoption of the Cement rate from January-2017 to December-2017. All the rates are inclusive of all taxes, unless otherwise mentioned.

Sl. No.	Material	Rates as finalized in the present meeting from January-2017 onward till December-2017. (Cement Items)	
1	CEMENT	Cement Rates - destination wise per bag (inclusive of all taxes, transportation and unloading) (Any changes in the Statutory levies has to be added or deducted from the price accordingly)	
	Category of Construction Activity		Applicable till
A	Housing Programme (Urban & Rural), CC Roads in Rural areas and Anganwadi Centers etc & all projects relating for Rural Development Department,	OPC 43/53 grade Rs. 240/- PPC/PSC grade Rs. 230/-	31 <sup>st</sup> December, 2017.

Z: T4\_Nolice/Chokapa SSR-146-SSR/Cement & Steel weekly rate 2017 C: Memo on Cement Rate.docx

	MGNREGS works			
B	Other Construction Activities of Government of Andhra Pradesh	OPC 43/53 grade PPC/PSC grade	Rs. 250/- Rs. 240/-	31 <sup>st</sup> December, 2017.
C	Polavaram Irrigation Project	PPC/PSC grade	Rs.250/-	Till Completion of the Project

\*Note: - Copy of this Memo is also available at [www.appublichealth.gov.in](http://www.appublichealth.gov.in)

SD/-  
ENGINEER-IN-CHIEF (PH)


To,  
All Superintending Engineers (PH). They are requested to communicate the above rates to all the Executive Engineers (PH) and Municipal Engineers in their circle. Copy to Chief Engineer, GVMC & VMC for information. Copy to Executive Engineers, O/o ENC (PH). Copy to Dy.E.E's T1, T2, T3, T4, & T5 sections, O/o Engineer-In-Chief (PH). Copy to all the Municipal Engineers of all the Municipal Corporations.

//Attested//

→ A. Ramesh Kumar 23/3/17  
Deputy Executive Engineer (PH)

Z: T4\_Nolice/Chokapa SSR-146-SSR/Cement & Steel weekly rate 2017 C: Memo on Cement Rate.docx

# Maharashtra Metro Rail Corporation & CPWD Chennai

  
महाराष्ट्र मेट्रो रेल कॉर्पोरेशन लिमिटेड  
**MAHARASHTRA METRO RAIL CORPORATION LIMITED**  
(भारत सरकार आणि महाराष्ट्र शासनाचा संयुक्त उपक्रम)  
A Joint Venture of Govt. of India & Govt. Of Maharashtra  
NAGPUR METRO RAIL PROJECT

CIN: U60100MH20155GC262054

No. NMRP/AGM (Cont.)\Vendor Registration/Renewal-1/2019/ 2030  
Dt. 21.11.2019.

To  
M/s JSW Cement Limited.  
JSW Centre, Bandra  
Kurla Complex, Bandra (East),  
Mumbai-400051

Sub: Your Application for renewal of Vendor Registration of approved products with Maharashtra Metro Rail Corporation Ltd - Regarding.  
Ref: Your letter No. Nil dated 16.10.2019 with a request for renewal of your approved products.

Dear Sirs,


This has reference to your letter referred above concerning the subject as submitted to this office and sought for renewal of your approved products as issued earlier by this office vide our letter No. Maha Metro/AGM (Cont.)/837 Vendor registration/2018/10725 dated 04.07.2018.

Our Corporation has gone through your documents as submitted to this office and would like to communicate that Maharashtra Metro Rail Corporation Limited has renewed your approved products of "Portland Slag Cement (PSC) for use in **Non-Dynamic Structures** only, (i.e. Metro station's Off Road Structure is Non-Dynamic Structure)".

**Please the note that the product approval/renewal is subject to the following terms and condition.**


1. In case, your product is required to be used in existing ongoing work, a fresh approval by concerned ED/CPM is necessary, who shall satisfy himself by conducting necessary satisfactory performance tests at Site & approved Laboratory initially and also time to time as per standard practices/ codes and also as directed by the Engineer-In-Charge, on cost benefit consideration while compared to approved vendors listed in the contract agreement.
2. Maha Metro will not give any assurance/Guarantee for use of your products/services for ongoing / future projects.
3. This Product Approval does not bind Maha Metro in any way for use of your product or services in our Metro Rail Projects
4. The approval shall stand cancelled automatically in case of any negative feedback about the performance/ compliance on your products to the specification & Quality requirement from previous organizations where the products has been used.
5. Maha Metro reserves the right to remove or suspend the product approval without assigning any reasons and at any times.
6. Approval is further Subjects to use of approved source of raw material and process method for the approved product.
7. This Renewal of your product approval is, accorded for further period **One year only**.


Thanking you

  
Yours faithfully  
(T Kumaresan)  
Addl. General Manager (Contracts)  
& Vendor Registration Process

Cc: Director (P)

Registered Office  
"Metro House", 28/2, C.K. Naidu Marg, Anand Nagar, Civil Lines, Nagpur-440 001  
Telefax : 0712-2554217 Website : www.metrorailnagpur.com

  
Government of India  
Office of the Additional Director General(SR)  
CENTRAL PUBLIC WORKS DEPARTMENT  
1<sup>st</sup> Floor, "G" Wing, Rajaji Bhawan  
3<sup>rd</sup> Avenue, Besant Nagar  
Chennai - 600 090.  
☎ 044-2491 2478, Fax : 2491 3691

  
Dated: **16 JAN 2015**

No.35 (4)/ADG (SR)/Misc/QA/ 17 & - 30

OFFICE MEMORANDUM

Sub: Approval for cement of M/s JSW Cement Limited, Hyderabad-Reg.


...

Approval of ADG (SR) I, CPWD, Chennai is hereby conveyed for the use of JSW-Portland Slag Cement[IS455-1989] manufactured by M/s JSW Cement Limited, having Registered office at JSW CENTRE,opp.MMRDA Ground, Bandra Kurla complex,Bandra(East),Mumbai-400051 on CPWD works in Southern Region I up to two years from the date of issue of this approval, subject to renewal of BIS certification beyond 28.02.2016.

The Supervisory officers shall ensure that the product conforms to the specifications as laid down in CPWD Specifications and relevant IS codes to the full extent applicable.

Quality and performance standards of the product shall be watched and deficiencies if any, shall be intimated to the ADG (SR) I


The approval given above does not absolve Supervisory officers from their responsibility for the products quality, rate and performance and to achieve this, proper check on the quality of the product actually to be used should be exercised before use.

  
(R.SELVARAJU)  
DIRECTOR (WORKS CUM TLQA)

Copy to:


1. The special Director General, Southern Region, CPWD, Chennai.90
2. All Chief Engineers, under southern Region I, CPWD for information and necessary action.
3. M/s JSW Cement Limited,7<sup>th</sup> Floor,No.702,Block A,Babukhans' Millennium Center, Somajiguda, Hyderabad-500082 with reference to letter No Nil dt 28.10.2014 and 13.01.2015.

To be put up on C.P.W.D. Southern Region Website.

  
(R.SELVARAJU)  
DIRECTOR (WORKS CUM TLQA)

# DMRC Approval for PSC Concrete Design Mix at MMRDA Mumbai Metro Rail Project

CIN NO. U74899DL 1995GOI068150 दूरभाष Tel. : 022-2570 0248  
022-2570 0245

 **दिल्ली मेट्रो रेल कॉर्पोरेशन लि 0**  
**DELHI METRO RAIL CORPORATION LTD.**  
( भारत सरकार एवं दिल्ली सरकार का संयुक्त उपक्रम )  
( A JOINT VENTURE OF GOVERNMENT OF INDIA AND GOVT. OF DELHI )  
७०३-७०४ पवई प्लाज़ा, सेंट्रल एवेन्यू रोड, हिरानंदानी गार्डन, पवई, मुंबई - ४०० ०७६  
703-704, Powai Plaza, Central Avenue Road, Hiranandani Garden, Powai, Mumbai - 400 076  
DMRC/GM/C/L-6/BC-02R/1205/Vol-28/ 3711 Date: 09.04.2021

To:  
MBZ-EIIL (JV)  
"Eagle Nest" Bk. No. 758,  
Behind Chopra court,  
Ulhasnagar-421003, Maharashtra (India)

Project: Contract: DMRC/MU/LINE6/BC/02R: Part design and construction of viaduct and 5 elevated stations viz. Mahakali Caves, SEEPZ Village, Saki Vihar Road, Rambaug & Powai Lake (excluding Architectural finishing and Pre-engineered steel roof structure of stations) from chainage- 5257.40 m to 9586.50 m of Swami Samarth Nagar – JVL R – SEEPZ – Kanjur Marg – Vikhroli (EEH) Metro corridor (Line-6) of Mumbai Metro Rail Project.

Sub: Approval of Concrete mix design of grade M-50 for Pier and site structure, 55 for U-Girder recess filling and M-40 for pile and pile cap work from Casting Yard Wadala Plant.

Ref: i. MBZ-EIIL (JV)/METRO/2021/1163 dated 27.02.2021  
ii. MBZ-EIIL (JV)/METRO/2021/1164 dated 27.02.2021  
iii. MBZ-EIIL (JV)/METRO/2021/1161 dated 27.02.2021  
iv. MBZ-EIIL (JV)/METRO/2021/C-1249 dated 01.04.2021

Dear Sir,  
With reference to the above, it is to inform you that the Engineer-In-Charge has approved the Mix Design of grade M-50 for Pier and site structure, M-55 for U-Girder recess filling and M-40 for pile and pile cap work from Casting Yard Wadala Plant with the following details.

**Table-1**  
**Concrete Mix Design M-50 for pier and structure work**

Sr.No	Description	Quantity in SSD(Per Cum)
1	Cement –OPC 53 grade ( ACC )	445 kg
2	20mm Coarse Aggregate - Uran	607 kg
3	10mm Coarse Aggregate - Uran	435 kg
4	Fine Aggregate crushed sand - Uran	837 kg
5	Water- Sanket Water supplier, Chembur	155 kg (W/C ratio - 0.33)
6	Chemical Admixture - ATPL	6.110 kg (1.3%)
7	Micro silica (Cornice SF)	25 kg

**Table-2**  
**Concrete Mix Design M-55 for U-Girder recess filling and site structure work**

Sr.No	Description	Quantity in SSD (Per Cum)
1	Cement –OPC 53 grade ( Ultra Tech )	450 kg
2	20mm Coarse Aggregate - Uran	0 kg
3	10mm Coarse Aggregate - Uran	999 kg
4	Fine Aggregate crushed sand - Uran	876 kg
5	Water- Sanket Water supplier, Chembur	152 kg (W/C ratio - 0.32)
6	Chemical Admixture - ATPL	6.175 kg (1.3%)
7	Micro silica (Cornice SF)	25 kg

**Table-3**  
**Concrete Mix Design M-55 for U-Girder recess filling and site structure work**

Sr.No	Description	Quantity in SSD(Per Cum)
1	Cement –OPC 53 grade ( Ultra Tech )	450 kg
2	20mm Coarse Aggregate - Uran	0 kg
3	10mm Coarse Aggregate - Uran	1002 kg
4	Fine Aggregate crushed sand - Uran	879 kg
5	Water- Sanket Water supplier, Chembur	152 kg (W/C ratio - 0.32)
6	Chemical Admixture - ATPL	6.175 kg (1.3%)
7	Micro silica (Cornice SF)	25 kg

**Table-4**  
**Concrete Mix Design M-40 for Pile, Pile Cap work**

Sr.No	Description	Quantity in SSD(Per Cum)
1	Cement – PSC ( JSW )	475 kg
2	20mm Coarse Aggregate - Uran	579 kg
3	10mm Coarse Aggregate - Uran	382 kg
4	Fine Aggregate crushed sand - Uran	911 kg
5	Water- Sanket Water supplier, Chembur	152 kg (W/C ratio - 0.32)
6	Chemical Admixture - ATPL	6.175 kg (1.3%)

1. The design mix is approved with materials only of mentioned make & sources. In case of any change in make/sources of any material, you will have to produce a separate mix design of M55 for U-Girder recess filling, M50 for pier work and M-40 for pile and pile cap work from casting yard Wadala plant.

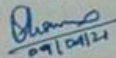
2. Regular review of physical and chemical properties of the source of all ingredients used in the mix design as per the employer requirement and approved ITP.

3. Concrete cubes shall be cast as per contract provisions to check the Characteristics compressive strength for routine work.

4. The performance of concrete mix shall be reviewed at periodical interval to meet the design requirement as per the technical specifications and employer's requirements.

This above approval shall not relieve the contractor from any responsibility including responsibility for his error, omission, discrepancies and non-compliance as per contract clause.

Thanking you!

Yours Sincerely  
  
(Sanjay Kumar)  
PM-02/Line-6/Mumbai

M40 Pile and Pile Cap Mix Design with PSC

# MHADA- Approval & Product Registration

महाराष्ट्र गृहनिर्माण व क्षेत्रविकास प्राधिकरण  
MAHARASHTRA HOUSING AND  
AREA DEVELOPMENT AUTHORITY



## APPROVAL LETTER

No : CE-1/EE-1/A/ET-295/2020  
Date : 17/03/2020

To  
✓ M/s. JSW Cement Ltd.  
JSW Center,  
Bandra Kurla Complex,  
Bandra(east), Mumbai- 400051

Sub: Approval and Product registration at MHADA  
....."JSW 43 grade, 53 grade, Portland Slag Cement" product  
approval for use in MHADA works.

Ref: 1) Your letters dtd.16/03/2020 & 16/09/2020  
2) This office letter no.ET-44, dt. 20/03/2020

Sir,

This has reference to your above said letters and subsequent correspondence on captioned subject matter. As requested, your proposal for registration of your product "JSW 43 Grade, 53 Grade, Portland Slag Cement (PSC)" for use in MHADA projects is hereby approved on the following terms and conditions.

### Terms and Conditions :

- 1) The validity of the enlistment shall be for **TWO YEARS** from issue of this letter. However, the MHADA reserves the right to cancel the same.
- 2) The product shall be in conformity with requirements of specifications of Bureau of Indian Standards.
- 3) The approval has been granted on the basis of documents/information furnished by the vendor. The renewal would be cancelled if any details are found in variance to the details already furnished during the inspection of manufacturing unit. MHADA reserves the right to visit the manufacturing unit at any time.

E:\JSW cement\_16-9-20.docx

गृहनिर्माण भवन, कलानगर, वांद्रे (पूर्व), मुंबई ४०० ०५१.  
दूरध्वनी ६६४० ५०००  
फैक्स नं: ०२२-२६५२०५८

Griha Nirman Bhavan, Kalanagar, Bandra (East), Mumbai-400 051.  
Phone : 66405000.  
Fax No. : 022-26592058 Website : www.mhada.maharashtra.gov.in

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- 4) The registration shall not bind MHADA to give the vendor any priority or preference in the issue of enquiry and placement of purchase orders and does not guarantee that all or any of the enquiries for the above items would necessarily be sent to vendor.
- 5) The vendor shall arrange for visit for MHADA Engineers for inspection of sites, where the products are used/being used, at its own cost, as and when intimated by MHADA.
- 6) The Change in Postal address, contact Phone No., Fax No., in the Constitutions or working of the firm, if any, shall be intimated to approving Authority immediately.
- 7) The vendor has to obtain the revalidation by applying 30 days prior to expiry of this registration. Else, revalidation of product renewal shall not be considered. Company shall pay applicable renewal fees before any renewal of renewal, as applicable.
- 8) During the warranty period, the prospective purchaser's complaint for defective material shall be attended by the vendor free of cost within a month's time from date of complaint.
- 9) During the period of enlistment, if the vendor improves product value by acquiring additional quality accreditations and/or achieves better financial performance, then such changes shall be invariably informed to MHADA from time to time.
- 10) This further renewal will be on request of the firm & depending upon the performance of product on MHADA works.
- 11) Please note that MHADA reserves the right to revoke the registration without assigning any reason.

Yours faithfully,

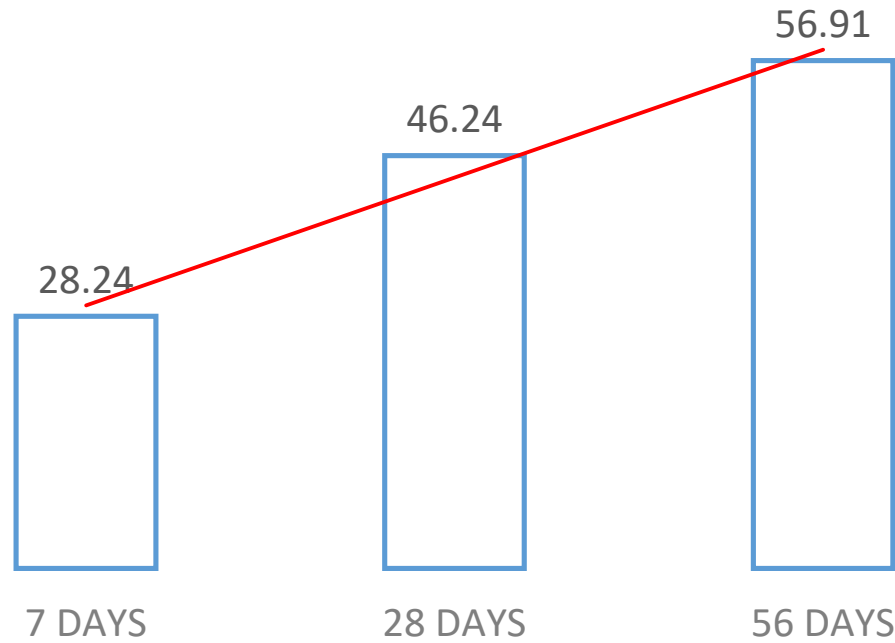
Chief Engineer - I  
Authority



# GGBS Mix Performance @ Metro Rail Projects

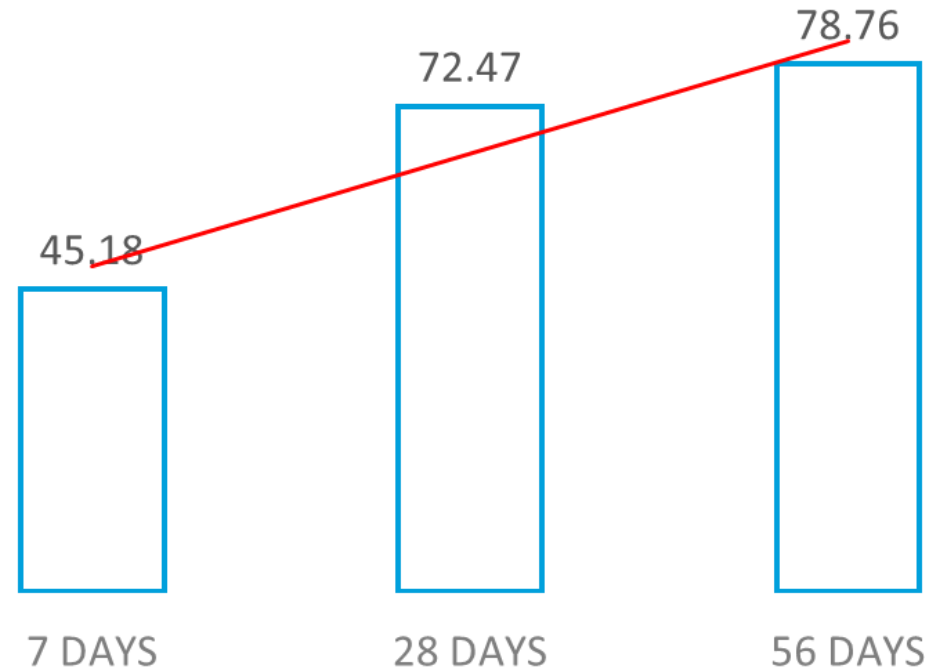


### M35 Pile Concrete\_Metro Rail



**M35 Grade\_TCC 430 Kg/CUM with 50% GGBS replacement (215 OPC, 215 GGBS)**

### M60 Pier\_Metro Rail



**M60 Grade\_TCC 575 Kg/CUM with 27% GGBS replacement (400 OPC, 150 GGBS, 25 Microsilica)**

# Concrete Mix Performance for NHAI Project- Mumbai Goa Highway, Mangaon with JSW Concreel HD Cement

**BLOOM COMPANIES, LLC** In Association With **CREDIBLE**

Bloom/Ind-Wad/NH-66/Pkg-I/2021/471 Date: 21<sup>st</sup> Sept. 2021

To,  
M/s Chetak-Apco [JV]  
Nijampur Road, Near Amit Complex,  
Opposite to Nilmani Hotel  
Tal: Mangaon, Dist: Raigad,  
Maharashtra  
Pin - 402104

Sub: Rehabilitation & Upgradation of Indapur to Wadpale section of NH-17 (New NH-66) from existing Km.84.000 to Km.108.400 4-lane with paved shoulder through an Engineering, Procurement & Construction (EPC) Contract under NHDP Phase-IV in the State of Maharashtra  
Reg:- Approval of Pavement Quality concrete (PQC) mix design of Grade M-40.

Ref: 1) IW-NH-66/EPC/2021-22/974 dated 08.09.2021

Dear Sir,

With reference to above cited proposal for approval of Concrete Mix Design of grade M-40 as per IS: 10262-2009 & MORT & H specification.  
We have reviewed the same and found in order.

TM No.	RFI No.	Grade	Cement	Admixt ure	Cement	W/C%	Adm %	Source of Aggregate	Avg. Flexible strength at 7 days (mpa)	Avg. Flexibl e strength h at 28 days (mpa)	Avg. Comp. strength at 7 days (mpa)	Avg. Comp. strengt h at 28 days (mpa)
246	737	M-40 PQC	JSW PSC Concreel HD	Pinnacle HY PC	380	0.38	1.3	Chetak Stone Crusher Gharos e	3.78	5.56	35.19	52.73

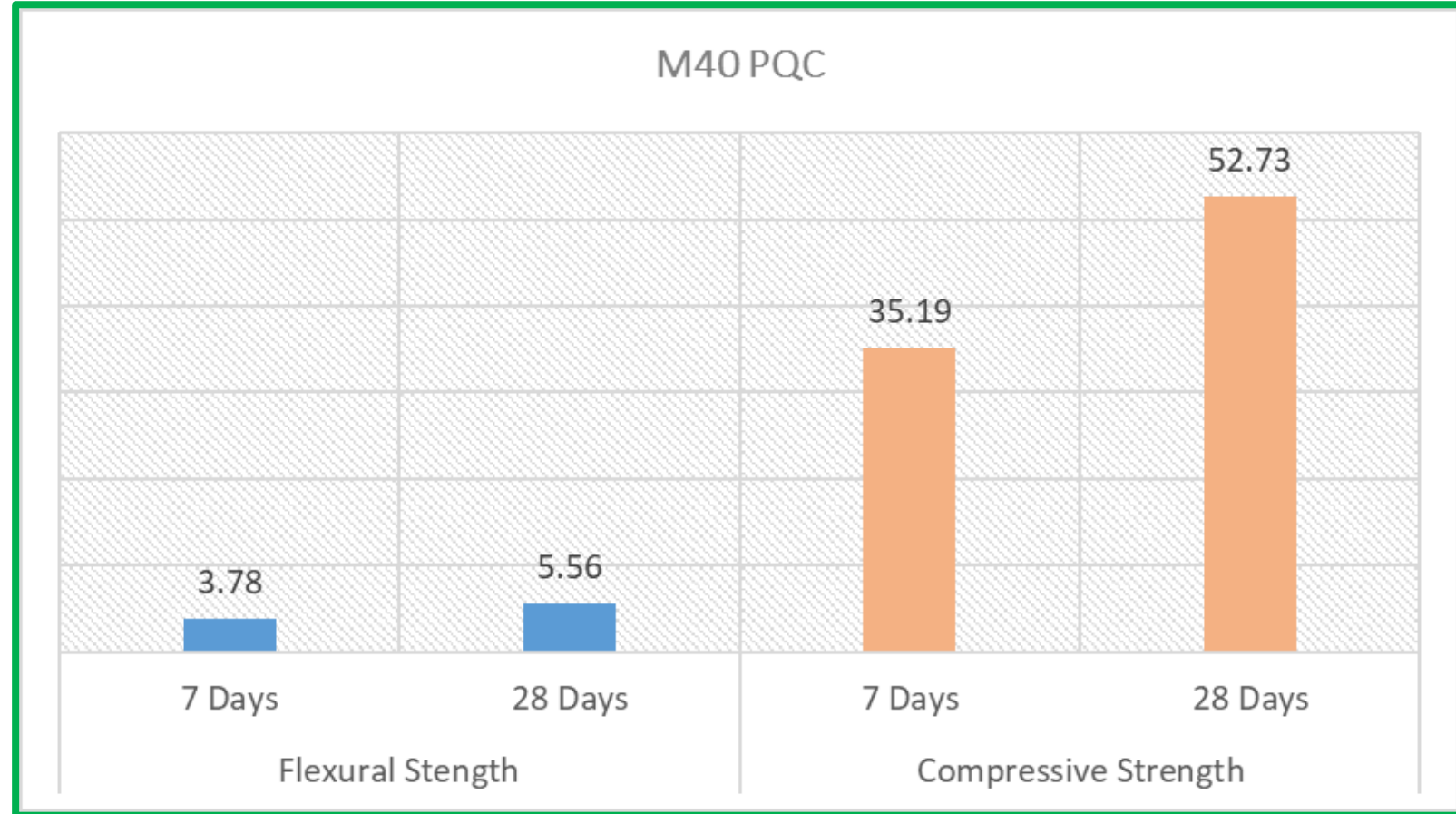
Hence we are approving the same.

Yours Faithfully,  
For Bloom Companies, LLC In Association with Credible Management & Consultant Pvt. Ltd.


(PRASAD DESHPANDEY)  
TEAM LEADER NH-66, MAHAD.

CC: 1) Executive Engineer, National Highways, PEN Division, PWD Maharashtra.  
2) AEE, National Highway Sub-Division, Mahad, Raigad  
3) H.O. Bloom-CMC


Corporate Office India: 1105 R&C Wellness Tech Park Sector-48 Sakas Road Gurgaon Haryana-122018 Phone-9124-4292185  
Project Office: Govind Sagar Building, first floor, 2 & 3 PG City Complex, Mahad, Raigad, Maharashtra-402301.  
E Mail: info@bloom-india.com, mahadoffice@bloom-india.com Website: www.bloomindia.com



# Concrete Mix Performance for NHAI Project- Mumbai Goa Highway, Mangaon with JSW Concreel HD Cement



In Association With



Bloom/Ind-Wad/NH-66/Pkg-I/2021/472 Date: 21<sup>st</sup> Sept. 2021

To,  
M/s Chetak-Apco [JV]  
Nijampur Road, Near Amit Complex,  
Opposite to Nilmani Hotel  
Tal: Mangaon, Dist: Raigad,  
Maharashtra  
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Sub: Rehabilitation & Upgradation of Indapur to Wadpale section of NH-17 (New NH-66) from existing Km.84.000 to Km.108.400 4-lane with paved shoulder through an Engineering, Procurement & Construction (EPC) Contract under NHDP Phase-IV in the State of Maharashtra  
Reg.: Approval of Concrete mix design of M-45pump, M-40Pump, M-35Pump and M-30Pump, M-25Pump and M-20Kerb.

Ref: 1) IW-NH-66/EPC/2021-22/975 dated 08.09.2021

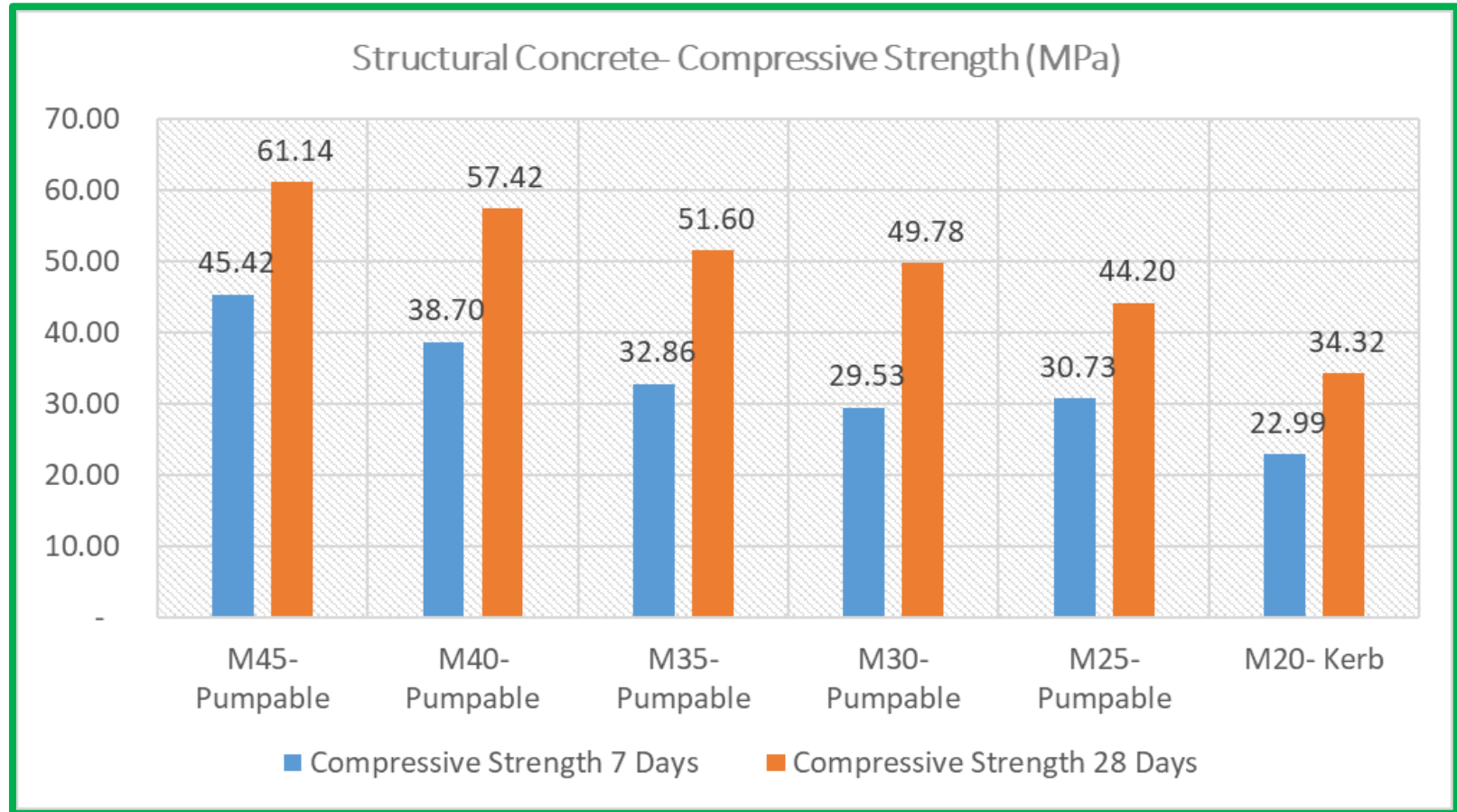
Dear Sir,

With reference to above cited proposal for approval of Concrete Mix Design of M-45, M-40, M-35, M-30, M-25 and M-20 Kerb as per IS: 10262-2009 & MCRT & H specification. We have reviewed the same and found in order.

TM No.	RFI No.	Grade	Cement	Admixture	Cement	W/C%	Adm %	Source of Aggregate	Avg. Comp. strength at 7 days (mpa)	Avg. Comp. strength at 28 days (mpa)
245	735	M-45 Pump	JSW PSC Concreel HD	Pinnacle HY PC	440	0.34	0.65	Chetak Stone Crusher Gharose	45.42	61.14
244	733	M-40 Pump	JSW PSC Concreel HD	Pinnacle HY PC	420	0.37	0.6	Chetak Stone Crusher Gharose	38.70	57.42
239	726	M-35 Pump	JSW PSC Concreel HD	Pinnacle HY PC	410	0.37	0.6	Chetak Stone Crusher Gharose	32.86	51.60
238	725	M-30 Pump	JSW PSC Concreel HD	Pinnacle HY PC	380	0.38	0.7	Chetak Stone Crusher Gharose	29.53	49.78
240	728	M-25 Pump	JSW PSC Concreel HD	Pinnacle HY PC	350	0.40	0.80	Chetak Stone Crusher Gharose	30.73	44.20
242	732	M-20 Kerb	JSW PSC Concreel HD	Pinnacle HY PC	280	0.43	1.3	Chetak Stone Crusher Gharose	22.99	34.32



Corporate Office India: 1105 B&C Wellstone Tech Park Sector-48 Sohna Road Gurgaon Haryana-122016 Phone: 0124-4292105  
 Project Office: Gavind Sagar Building, first floor, 2 & 3 PG City Complex, Mahad, Raigad, Maharashtra-402301.  
 E-Mail: info@bloom-mts.com, mahadoffice@bloom-india.com Website: www.bloomcs.com



# Case Study 1: Underground Metro Rail, Mumbai



Project	Mumbai Underground Metro Line III- Colaba to Seepz
Contractor	Dogus- Soma JV
Client	MMRCL
PMC	Maple
Grade of Concrete	M40 Grade Slab Concrete
Total Concrete Scope	Approx 3,00,000 CUM
RCPT	1000 Coulombs (max)
WPT	10 mm (max)
Design Life	<b>120 Years Service Life</b>

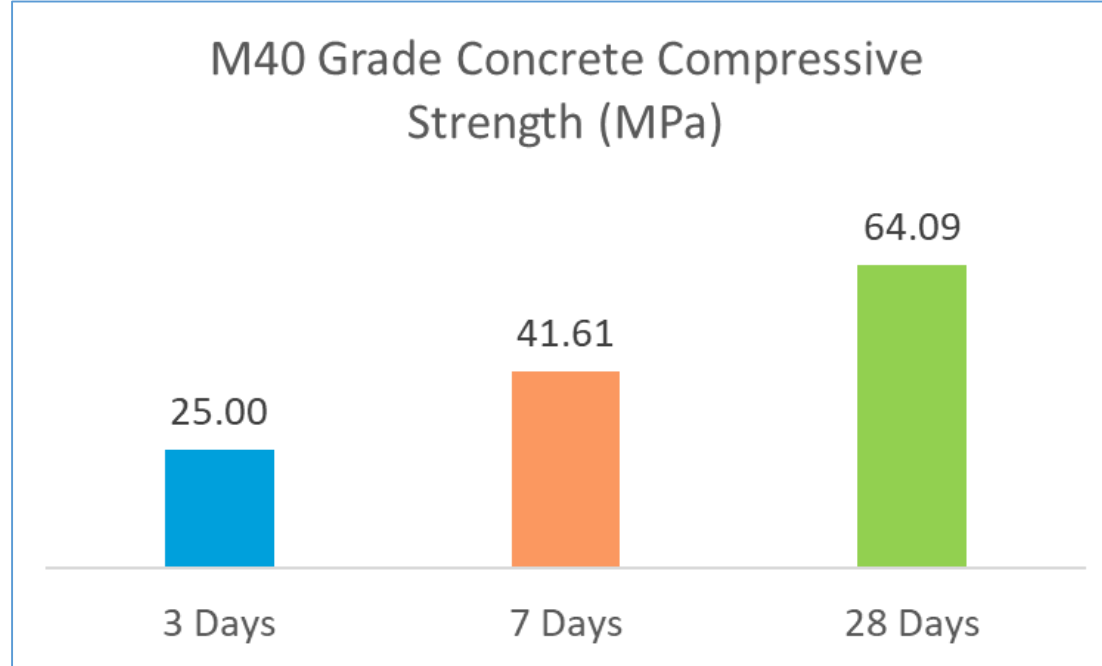


# Case Study 1: Underground Metro Rail, Mumbai



M40 Slab Concrete	Mix Design (SSD) Kg/CUM
OPC 53 Gr. @ 50%	237
GGBS (JSW) @ 46%	218
Microsilica @ 4%	18
Fine Aggregate	819
20 mm Coarse Aggregate	638
10 mm Coarse Aggregate	442
Free Water	142
Admixture	6.15

Fresh Concrete Properties	
Initial Slump	Collapse
Slump @ 120 min	165 mm



Concrete Durability Test Results		
Parameter	Design Requirement	Actual Performance
Water Penetration (DIN 1048-1991)	10 mm max @ 28 days	4.0 mm
RCPT (ASTM C 1202- 2017)	1000 Coulombs max @ 28 days	730 Coulombs

# GGBS Mix Performance @ Mumbai UG Metro Rail Specifications for 120 Years service Life



## Design Mix – In-situ Concrete at Station Subway



Mix Design

Mix Design : M40 Grade	Typ. Station
Water/ Cementitious	0.26
Constituent Materials	Kg / m3
Cement OPC 53	225
GGBS	205
Micro Silica	20
Manuf. Sand - Basalt	911
CA 10mm - Basalt	437
CA 20mm - Basalt	663
Water	143
Admix - Polycarbox -Auramix 400	6.53



Minutes-	Slump, mm	Measure	%
0	Collapse		
60	180	Bleeding	1.5
120	170	Air Content	0.4
150	130		

Plastic Properties

Compressive Strength		Concrete Durability Tests @ 28 days	
Age	N/mm2	Test	Value
7 Days	36.71	RCPT, Coulombs	703
28 Days	61.26	Permeability, mm	4.33

Hardened Properties

## Case Study 2: International Airport, Bangalore

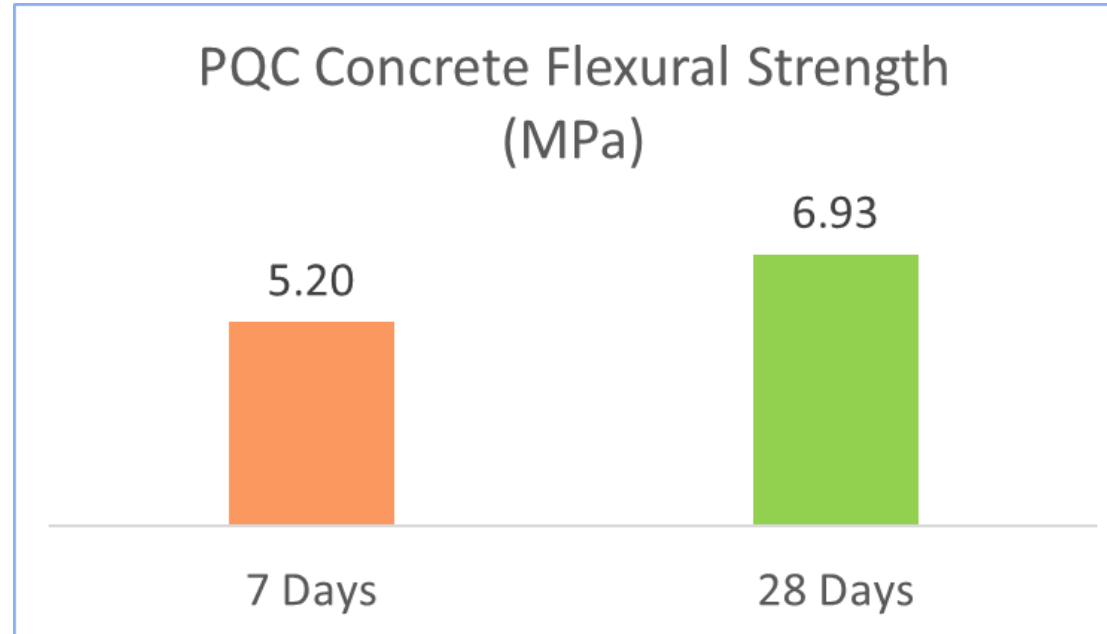


Project	KIAL, Bangaluru- Airfield Works- New South Parallel Runway, Apron & Associated works
Contractor	L&T Construction
Client	Kempegowda International Airport
Grade of Concrete	PQC
Design Flexural Strength	5.0 MPa (min) @ 28 Days



## Case Study 2: International Airport, Bangalore

M40 PQC Concrete	Mix Design (SSD) Kg/CUM
OPC 53 Gr. @ 60%	222
GGBS (JSW) @ 40%	148
Fine Aggregate	620
40 mm Coarse Aggregate	626
20 mm Coarse Aggregate	233
10 mm Coarse Aggregate	447
Free Water	141
Admixture	1.85





# Case Study 3: Cable Stayed Bridge, Goa

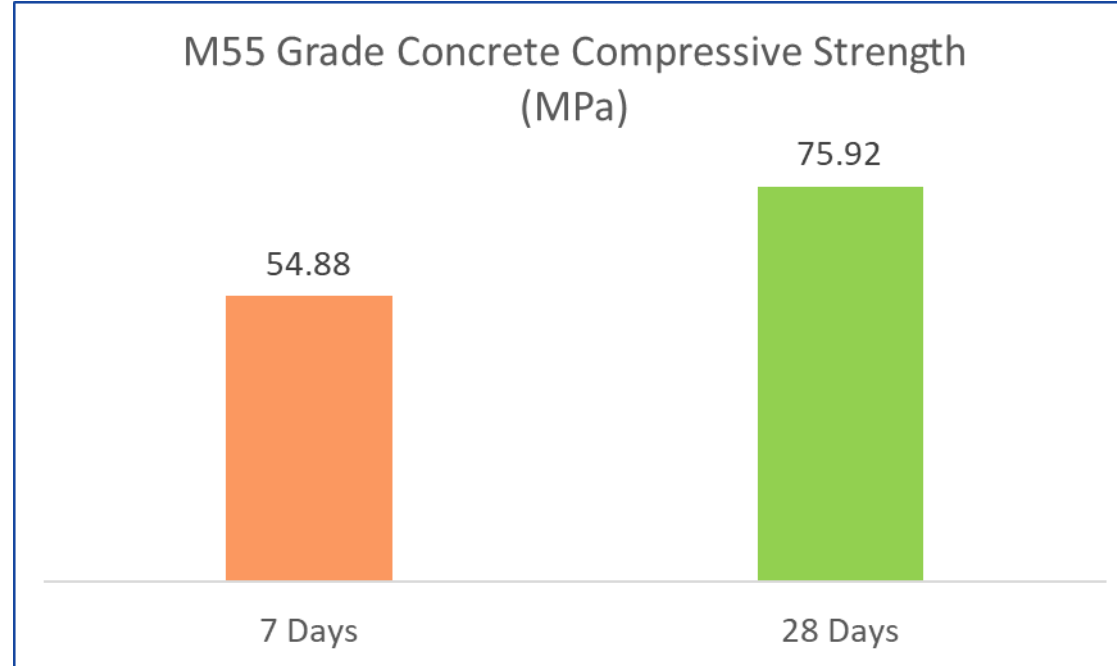
Project	Zuari Cable Stayed Bridge Project, Goa
Contractor	Dilip Buildcon Limited- MBZ (JV)
Client	MoRTH
Authority Engineer	TPF Engineering Pvt Ltd
Grade of Concrete	M55 Pile Cap Raft
Pile Cap Foundation Raft	9,698 CUM (89.8 X 27 X 4)



# Case Study 3: Cable Stayed Bridge, Goa

M55 RCC	Mix Design (SSD) Kg/CUM
OPC 53 Gr. @ 50%	270
GGBS (JSW) @ 50%	270
Fine Aggregate	696
20 mm Coarse Aggregate	630
10 mm Coarse Aggregate	495
Free Water	162
Admixture	2.43
Corrosion Inhibitor	3.00

Fresh Concrete Properties	
Initial Slump	Collapse
Slump @ 120 min	135 mm



Concrete Durability Test Results	
Parameter	Actual Performance
Water Penetration (DIN 1048-1991)	6.0 mm
RCPT (ASTM C 1202- 2017)	158 Coulombs

# Case Study 4: AP State Secretariat & HOD Office



Project	AP State Secretariat & HOD Office Buildings, Amravati
Contractor	Shapoorji Pallonji Engineering & Const.
Client	APCRDA, AP Govt
PMC	Egis India Consulting Engineers
Grade of Concrete	M45 Grade Raft
Concrete Design Consultants & Vetted By	Designed by Stredant Technoclinic Pvt Ltd & Vetted By IIT Madras
Raft Foundation Dimensions	52 X 52 X 4 m i.e. 10,816 CUM continuous pour in 72 hours

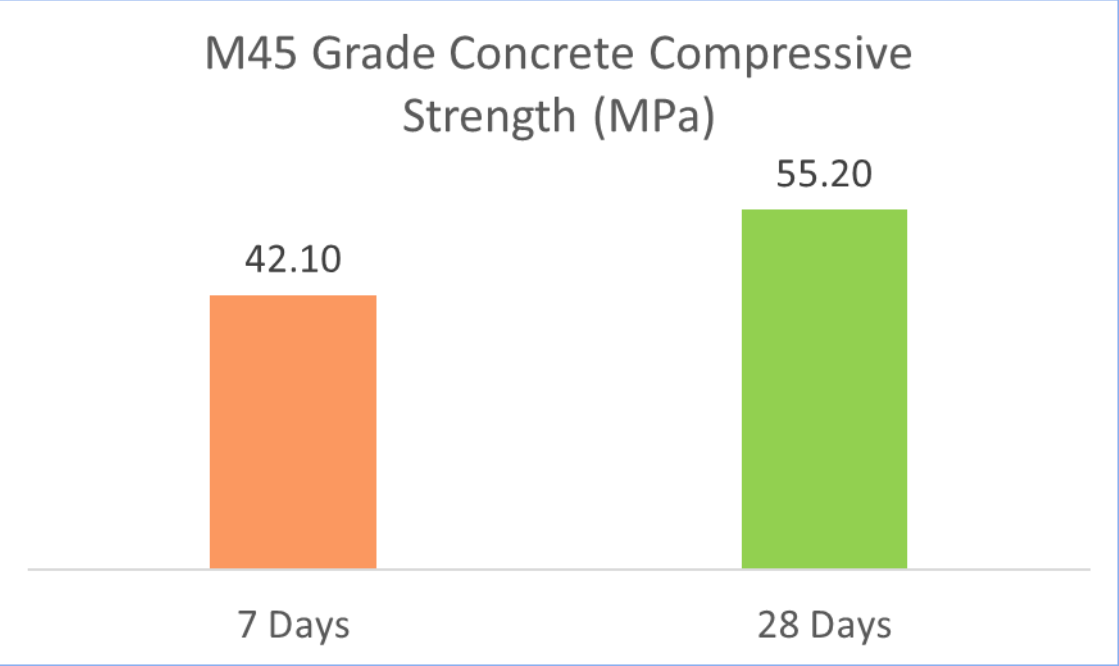


# Case Study 4: AP State Secretariat & HOD Office



M45 Raft	Mix Design (SSD) Kg/CUM
OPC 53 Gr. @ 40%	185
GGBS (JSW) @ 60%	275
Fine Aggregate	709
20 mm Coarse Aggregate	687
10 mm Coarse Aggregate	457
Free Water	161
Admixture	2.76

Fresh Concrete Properties	
Initial Slump	215 mm
Slump @ 120 min	185 mm



Concrete Durability Test Results	
Parameter	Actual Performance
Water Penetration (DIN 1048-1991)	11 mm
RCPT (ASTM C 1202- 2017)	1154 Coulombs
ISAT @ 30 min (BS 1881 Part 208- 1996)	0.1047
Water Absorption (BS 1881 Part 122-1996)	0.36

# JSW GGBS in India's Longest Sea Bridge – Mumbai Trans Harbour Link for 135 Years of Service Life

- The MTHL which is about 21.8 Km long 6 Lane road bridge across the Mumbai Bay between Sewri in Mumbai and Chirle in Navi Mumbai.
- The proposed Mumbai Trans Harbour Link ('MTHL') has been planned to facilitate decongestion of the island city.



- **Specifications for SCMs:**

1. ***GGBS & Ultra Fine additives must be incorporated in all concrete of grade M45 and above***
2. ***When GGBS is incorporated in concrete as a separate material, it shall not be less than 50% and more than 70% of total Cementitious content***
3. ***Chloride Migration Coefficient (Sub structure 2\*10-12m<sup>2</sup>/s and Super structure 2 to 8\*10-12m<sup>2</sup>/s***



# PSC- MAJOR INFRASTRUCTURE CLIENT/ CONTRACTORS



Chennai Metro Rail Limited



Ahluwalia Contracts (India) Ltd.



# GGBS- MAJOR INFRASTRUCTURE CLIENT LIST



Chennai Metro Rail Limited



MAHARASHTRA STATE  
ROAD DEVELOPMENT  
CORPORATION LTD



बृहन्मुंबई  
महानगरपालिका  
Municipal Corporation  
of Greater Mumbai



एम एम आर डी ए  
MMRDA



भारतीय राष्ट्रीय राजमार्ग प्राधिकरण  
National Highways Authority of India



# LIST OF ESTEEMED GGBS CUSTOMERS



Indiabulls



Mahindra LIFESPACES

soma



NCC  
NCC Limited



B L KASHYAP  
WE BUILD YOUR WORLD

DLFA  
BUILDING INDIA



IL&FS



BMRCL  
Bangalore Metro Rail Corporation Limited



PURAVANKARA  
Puravankara Projects Limited

Godrej  
PROPERTIES



Ready Mix Concrete & Concrete Product Industries-  
Commercial RMC, AAC Blocks, AC Sheet & Precast



Complete Concrete Solutions



Godrej & Boyce Mfg. Co. Ltd.



IJM CONCRETE  
PRODUCTS PVT LTD



# JSW GGBS.....

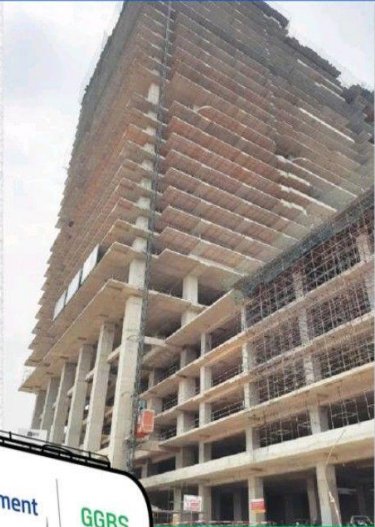


Shri Ram Janmabhoomi Teerth Kshetra



## THE PERFECT BLEND OF DURABILITY & SUSTAINABILITY

The construction of Hyderabad's tallest commercial tower, SAS Infra, is being strengthened by **JSW GGBS**



**JSW GGBS,**  
is being used by Dilip Buildcon  
to build a strong and sustainable  
**Bengaluru-Mysore Expressway**



LONG-TERM STRENGTH,  
SUPERIOR FINISH, AND  
DURABILITY FOR  
**SHAPOORJI PALLONJI REAL  
ESTATE'S JOYVILLE  
RESIDENTIAL COMPLEX AT  
HINJEWADI, PUNE WITH  
JSW GGBS**





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[gayatri.Joshi@jsw.in](mailto:gayatri.Joshi@jsw.in)

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**JSW Cement Ltd**  
**The Estate, 121, 3rd floor**  
**East Wing, Dickenson Road,**  
**Bangalore- 560042**