

DYPSSH - NERUL PROJECT

GRC Façade Works

REFERENCE – ARCHITECT SUBODH GHOGARE

GFRC FACADES

GRC – FRP – GRG WORKS

GRC FACADE WORKS AT DYPSSH – NERUL





GRC – FRP – GRG WORKS

COMPANY PROFILE

FAÇADE MODULE PATTERN – MOLD – GRC ELEMENT



PATTERN



MOLD



GRC ELEMENT



GRC ELEMENT



INSTALLED GRC MODULE ON SITE







GRC MODULE DETAILS ALL ELEVATIONS



Part NO.	Module	East	West	North	South	Total
M1		1876	2133	466	351	4826
M2		127	147	24	21	319
M3		59	67	12	14	152
M4			2	2		4

GRC MODULE DETAILS SURFACE AREAS

	Surface area in sqft
	25
	40.5
	103
	358

300mm Depth

INTRODUCTION



- WE TAKE THIS OPPORTINUIITY IN THANKING ALL CONCERNED FOR PROVIDING THE OPPORTUNITY BID FOR YOUR PRESTIGIOUS PROJECT .
- SHOP DRAWINGS ARE BEING WORKED UPON AND WILL TAKE SOME TIME.
- IN THE PRESENTATION, WE HAVE TRIED TO ADDRESS ALL YOUR CONCERNS IN WORDS AS WELL AS THRU PICTURES PERTAINING TO –
- METHOD STATEMENT
- JOINERY DETAILS BETWEEN PANELS - (BUTT JOINTS)
- PANEL FIXING
- CAST IN SOCKET DETAIL
- WATER PEPELLENT PAINT DETAILS ALSO ENCLOSED
- WE HOPE TO HAVE ADDRESSED ALL YOUR CONCERNS AND PLEASE FEEL FREE TO RAISE YOUR CONCERNS AND WE WILL ADDRESS THEM TO THE BEST OF OUR EXPERIENCE AND ABILITY.

FRP PATTERN & ELEMENT



RAW MATERIAL DETAILS – DATA SHEETS AVAILABLE



- WHITE .CEMENT – JK WHITE / BIRLA
- SILICA SAND – FROM GODHRA / RAJASTHAN
- ARG FIBRES – NEG – NIPPON , JAPAM
- PLASTICIZER – DOW
- POLYMER – DOW
- PIGMENT – COSMO
- WATER REPELLENT PAINT - DOW
- ANCHOR FASTENERS – KLIMAS
- STEEL – MS / GI
- CAST N SOCKET , NUTS & BOLTS WITH WASHERS – SS310

GRC ELEMENTS – PANELS & CORNICE

- GRC products are formed by a variety of manufacturing techniques. One of the most versatile is to cast the composite in molds manufactured from rubber, timber or Glass Fibre Reinforced Plastic (GRP/FRP). This is known as Premix GRC. As the high-performance alkali resistant glass fibres are evenly distributed in the mix, the material is reinforced throughout, enabling products with the finest of details to be created.
- **GRC** can be cast into fine details
- **GRC** offers designers unrivalled flexibility
- **GRC** moldings' and features are easy to handle and erect
- **GRC** does not suffer from corrosion
- **GRC** is used to produce beautiful architectural moldings and features. Whilst often cast with thicknesses in excess of 25 mm these products remain easy to handle and erect, and permit the architect or engineer an unrivalled freedom for creative design. GRC does not suffer from corrosion of the reinforcement. Unlike traditional concrete, GRC does not require a minimum of concrete cover to the reinforcement.

GFRC MANUFACTURING AT FACTORY / ON SITE

THE GFRC MANUFACTURING PROCESS INVOLVES:

- ELEMENT DETAIL FINALIZATION
- CAD AND SITE MEASUREMENTS - COMPARED AND SORTED OUT
- SHOP DRAWINGS – SUBMISSIONS AND APPROVALS
- INSTALLATION OF MS STEEL FRAME STRUCTURE
- THE BOQ OF ELEMENTS
- STENCIL & PATTERN CUTTING
- PATTERN MAKING DEPENDING ON ELEMENTS (POP, WOOD, CLAY)
- MOLD MAKING – (IN GFRP / RUBBER – BASED ON ELEMENT DETAILS)
- PATTERN AND MOLD MAKING AT FACTORY WILL BE SENT TO SITE
- CASTING OF GFRC ELEMENTS – ON SITE BY SPRAY TECHNIQUE
- FIXING ON MS STEEL FRAMEWORK / RCC / BLOCK & BRICK WORK
- FINISHING & HANDOVER

DECORATIVE ARCH MOLD



GRC FOR CLADDING

- GRC is one of the most popular materials used for creative prefabricated architectural cladding. GRC's ability to be molded into thin, lightweight panels with a wide variety of shapes, forms and surface finishes has been appreciated by a growing audience of architects and engineers worldwide.
- **GRC** is easily molded to reproduce shapes, details and textures
- **GRC** is high strength allows design of thin, lightweight cladding elements
- **GRC** can be colored with pigments, paints and natural stone facings
- **GRC** cladding can replace non-structural precast concrete where weight and/or shape may be problematic
- **GRC** cladding panels are generally manufactured by the 'Hand Spray' technique. As the name implies, the material is sprayed into a mold using special machinery. The method can produce high-performance materials from which panels with extremely thin, lightweight sections are achievable.

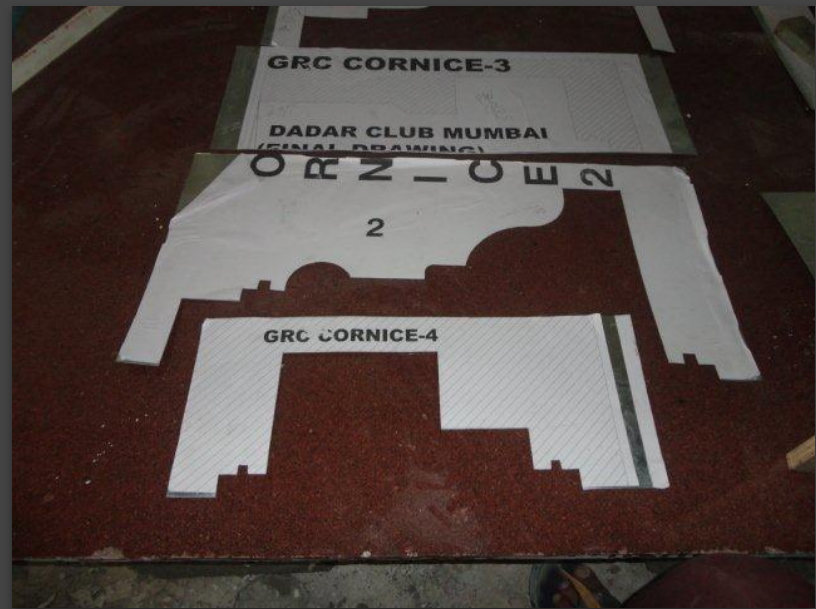
PATTERN MAKING OF AN ARCH



FRONT WITH GROOVE AND BACK OF A GFRC PANEL WITH BANDS AND RIBS



STENCIL & PATTERN CUTTING



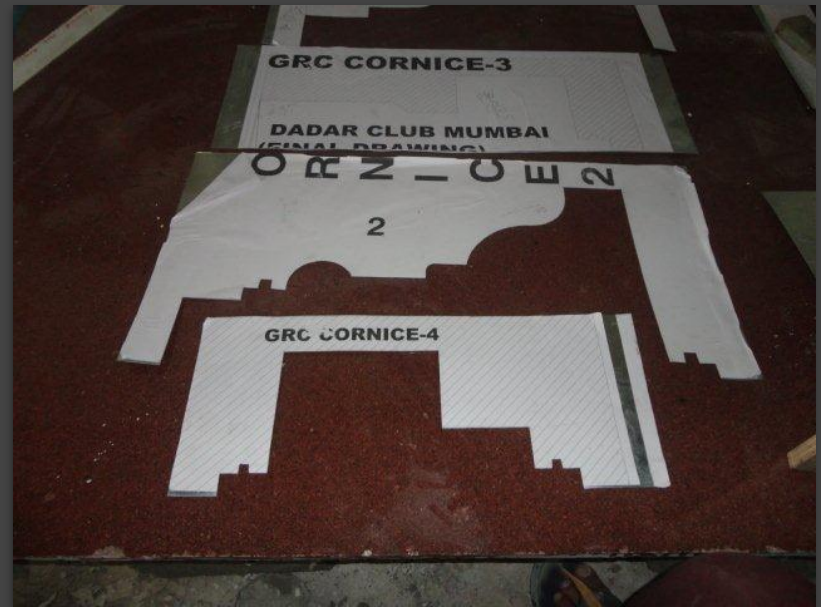
INFOSYS MAIN ENTRY PORTEL – MYSORE



BELIEVER'S CHURCH HOSPITAL - KERALA



PATTERN MAKING FOR CORNICE



KARAD VILLA



TYPICAL FIXING OF PANELS – JOINTS WILL NOT BE VISIABLE



GFRC PANELS WITH BUTT JOINT & SUPPORTED INDIVIDUALLY WITH L CLAMP



MOLD MAKING



WHAT IS GRC/GFRC ?



GRC FORMULATION			
<u>S.NO</u>	<u>MATERIAL</u>	<u>SPRAY (KGS)</u>	<u>CASTING (KGS)</u>
1	CEMENT	50 KGS	50 KGS
2	FINE AGGREGATE	50 KGS	50 KGS
3	PLASTICIZER	0.5 %	0.5 %
4	POLYMER	3 - 5 %	3- 5 %
5	WATER	13.5 L	14.5 L
6	A.R. GLASS FIBRE	3 - 5 %	2-3.5%

- Glass fibre Reinforced Concrete (GRC) is a cement-based composite material reinforced with alkali-resistant fibres. The fibres add flexural, tensile and impact strength and the resulting material allows the production of strong yet lightweight products used in architectural, civil engineering and many other applications.
- GRC is not a single material but a family of materials with different properties tailored to suit particular applications. The properties of GRC vary with the production method, the amount and type of glass fibre and the composition of the cementitious matrix.
- The properties of Glass fibre Reinforced Concrete (GRC) vary according to the production method, mix design, and the type and content of the alkali resistant Glass fibre

DYP – SCREENPATTERN & MOLD



PLACEMENT OF INDIVIDUAL PATTERNS IN A MOLD



POP PATTERN OF THE SCREEN



POURING RUBBER INTO A MOLD



LIFTING AND CLEANING DURING DEMOLDING

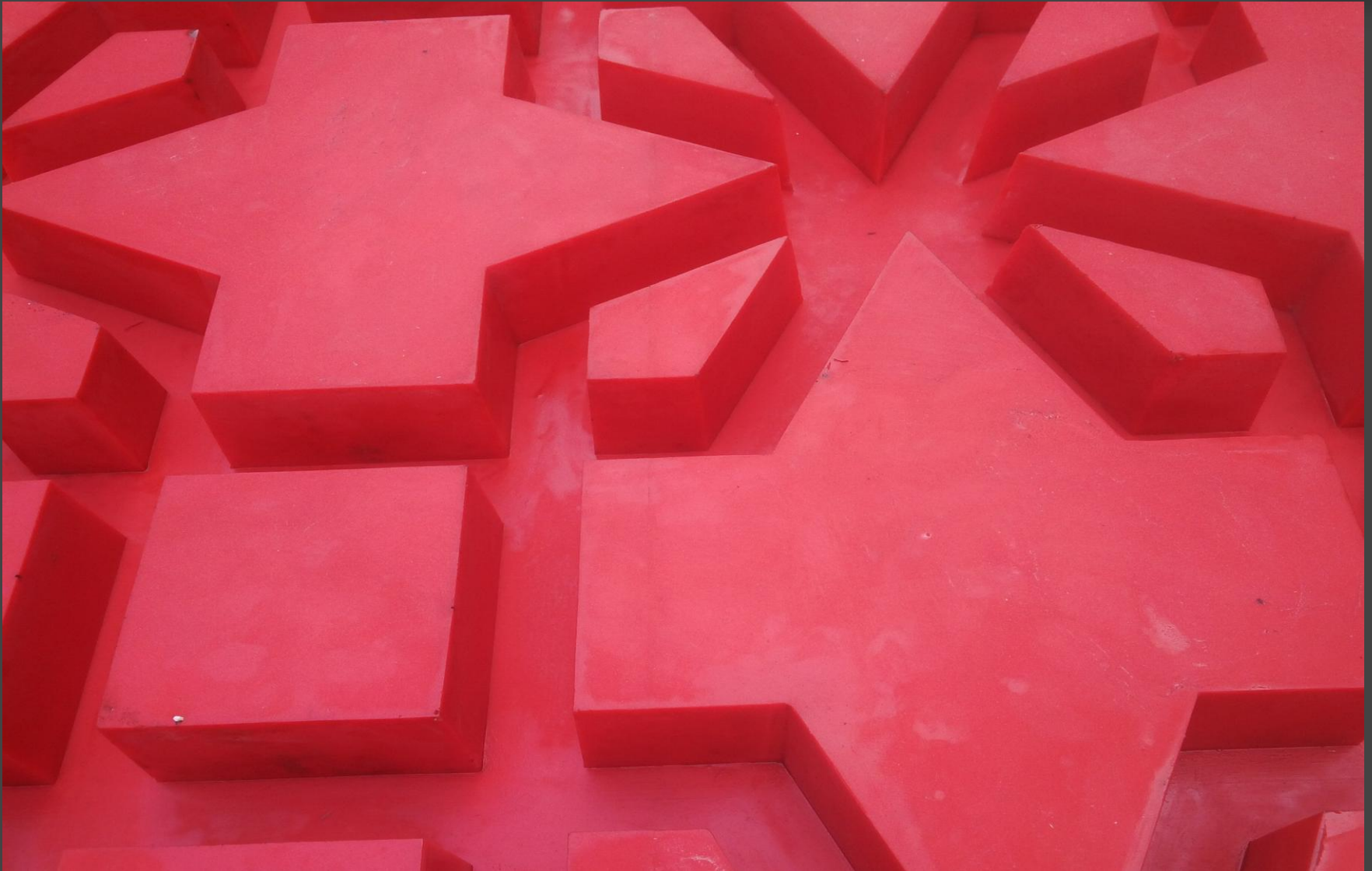
PROCESS CASE - MYSORE



CASTING OF A RUBBER MOLD



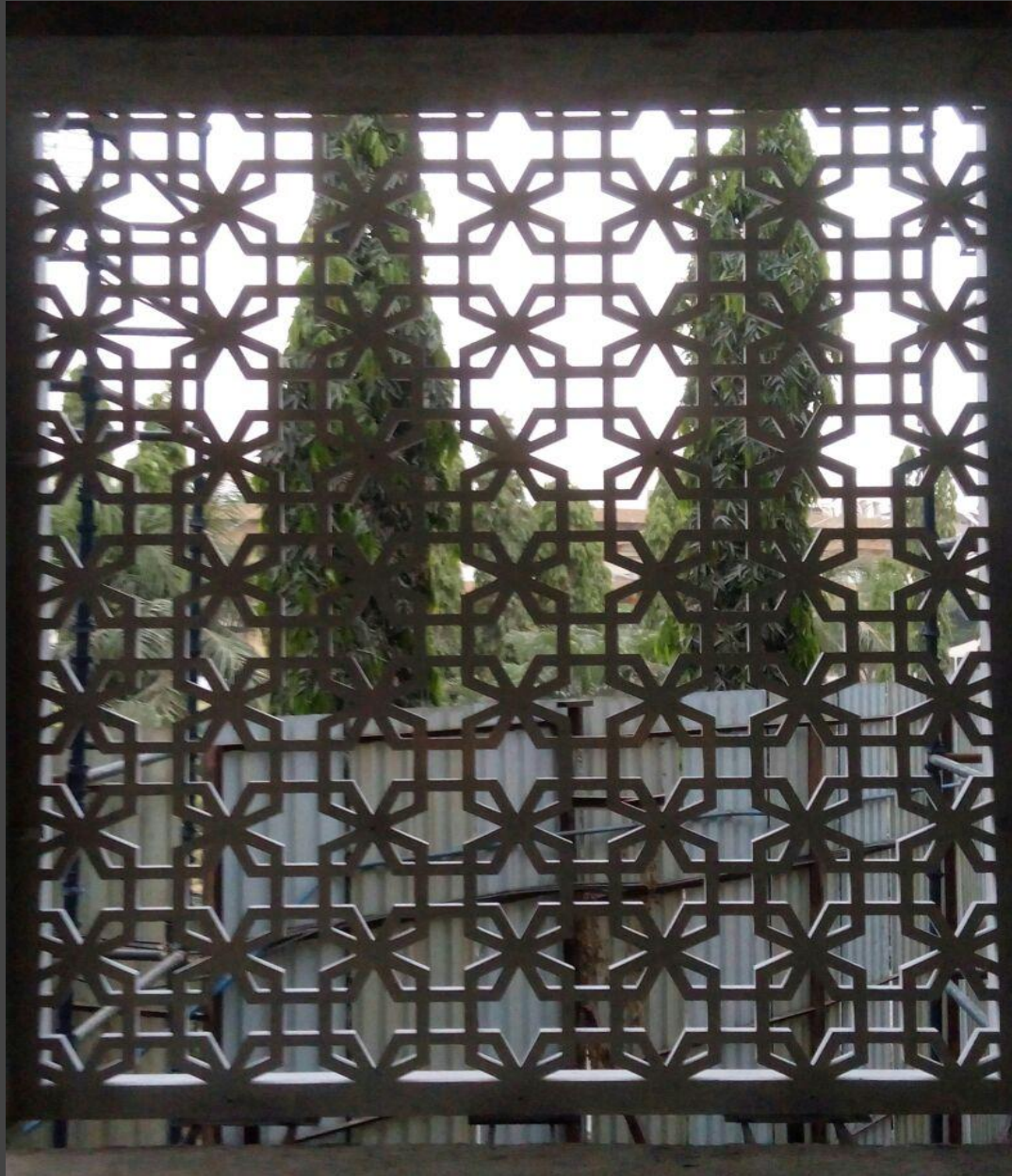
IPERFECT DETAILING IN A RUBBER MOLD



INFOSYS ENTRY GATE – MYSORE



BACK SIDE OF SCREEN



FRONT SIDE OF SCREEN



INFOSYS ENTRY GATE – MYSORE



GRC : KEY FEATURES



- **GRC** is environmentally friendly & is excellent for reproduction and renovation.
- **GRC** products reduce loadings on buildings leading to significant savings in superstructure and foundations.
- **GRC** provides the designer with a complete technology that few other materials can match for versatility.
- GRC is around 15 to 18 mm thick and may vary depending on the elements , its design projections, specified thickness to maintain stability.
- **OVERALL GRC THICKNESS** is generally 50 mm with ribs & bands & it is in these positions inserts / screws are fixed to hold the said element in its desired position.
- **WEIGHT OF GRC** is approx. 4 kgs per sq.ft & 45 kgs per sqm with 50 mm bands & ribs for stability of a panel.
- **DESIGNING WITH GRC ELEMENTS FOR A FAÇADE** it is important to consider a 75 mm gap between the GRC face & the building line as grc is 50 mm thick and 25 mm is generally considered to cover the undulations of the civil works.
- **JOINTS WITH GRC** a 5, 8, or 10 mm open groove / gap be left or the same be filled with PU **JOINT SEALANT** with threaded backer rod between 2 GRC elements as filling with GRC finish material will lead to hair line cracks & we do not recommend filling joints with GRC finishing materials.

CASTING OF GRC ELEMENTS – SPRAY TECHNIQUE



CAST IN SOCKET IN GFRC ELEMENTS



FRONT & BACK OF A CAST IN SOCKET PANEL



CAST IN SOCKET IN GFRC ELEMENTS



CASTING OF GRC ELEMENTS



ADVANTAGES OF GRC

- **LIGHTWEIGHT PRODUCTS**

Although GRC has a similar density to concrete, the products made from it are many times lighter due to the thin 10-15mm skin thickness used. A cladding panel manufactured from 100mm thick precast concrete would weigh 240 kgs per m² compared to a similar GRC panel of 40-50 kgs/m². In fact many GRC products can be lifted and carried by hand.

- **CORROSION AND ROT PROOF**

GRC products do not contain mild steel reinforcement and the problems associated with corrosion of reinforcement do not apply. GRC is unaffected by external exposure and will not rot. It is completely unaffected by exposure to UV light.

- **INCOMBUSTIBLE**

Most GRC formulations comply with non-combustible criteria for UK and EU standards. Polymer GRC is not classed as non-combustible but conforms to the requirements of Class 0 defined by the British Building Regulations.

GFRC INSTALLED PANELS



GFRC AT ITS BEST



GFRC AT ITS BEST



ADVANTAGES OF GRC

- **APPEARANCE**

GRC has a wide flexibility in design and manufacture, which enables it to reproduce most architectural styles and features. It can replicate virtually any surface detail and reproduce the appearance of materials such as stone, slate, terracotta and marble. Carved stonework involves specialized skills and is slow to produce making the end product expensive. GRC can match stonework in appearance and as it can be produced in thin sections it is easier to handle and fix.

- **COST EFFECTIVE**

GRC Products have been shown to provide economic solutions to many applications. Although the manufacturing costs may be higher than say concrete, when the reduced handling, transport and fixing costs are considered, there can be an overall saving.

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GROOVES BEING INCORPORATED AT CORNICE JOINTS



VARIOUS GRC ELEMENTS



CORNER GFRC PANELS



CORNER GFRC PANELS – INVISIBLE JOINTS



GFRC AT ITS BEST



GRC IN LANDSCAPING

- In building projects, leisure facilities, urban renewals and municipal schemes ever-increasing attention is being focused on the built environment. GRC is playing a major role.
- GRC is environmentally friendly
- GRC is durable against extreme weather conditions
- GRC products are lightweight and easy to handle
- GRC offers a wide variety of shapes and surface finishes
- Seating, planters, receptacles, kiosks, bollards, signs, statues and fountains, to name but a few, all benefit from being made in GRC with its ability to tailor shape, form and surface finish and to be aesthetically compatible with the chosen environment.
- GRC also provides theme park and zoological architects with a medium through which they can turn dreams into reality. Many of the world's largest theme parks and zoos use
- GRC to create rocks capes, replica buildings, simulated environments for animals, and much more.

THE SACHIN TENDULKAR CLUBHOUSE - STADIUM - MUMBAI



INFOSYS MAIN GATE MYSORE



INFOSYS MAIN GATE MYSORE GFRC PANELLING



VARIOUS GRC ELEMENTS



AFTER INSTALLING GRC ELEMENTS



SHARAD PAWAR AUDITORIUM - BARAMATI



WATER REPELLENT PAINT= AT EXTRA COST



Construction
Solutions

DOW CORNING

Introducing New *Dow Corning*[®] IE-6683 Water Repellent Emulsion



Fast beading action • Non-SiH • Low VOC • Water based • Dilutable

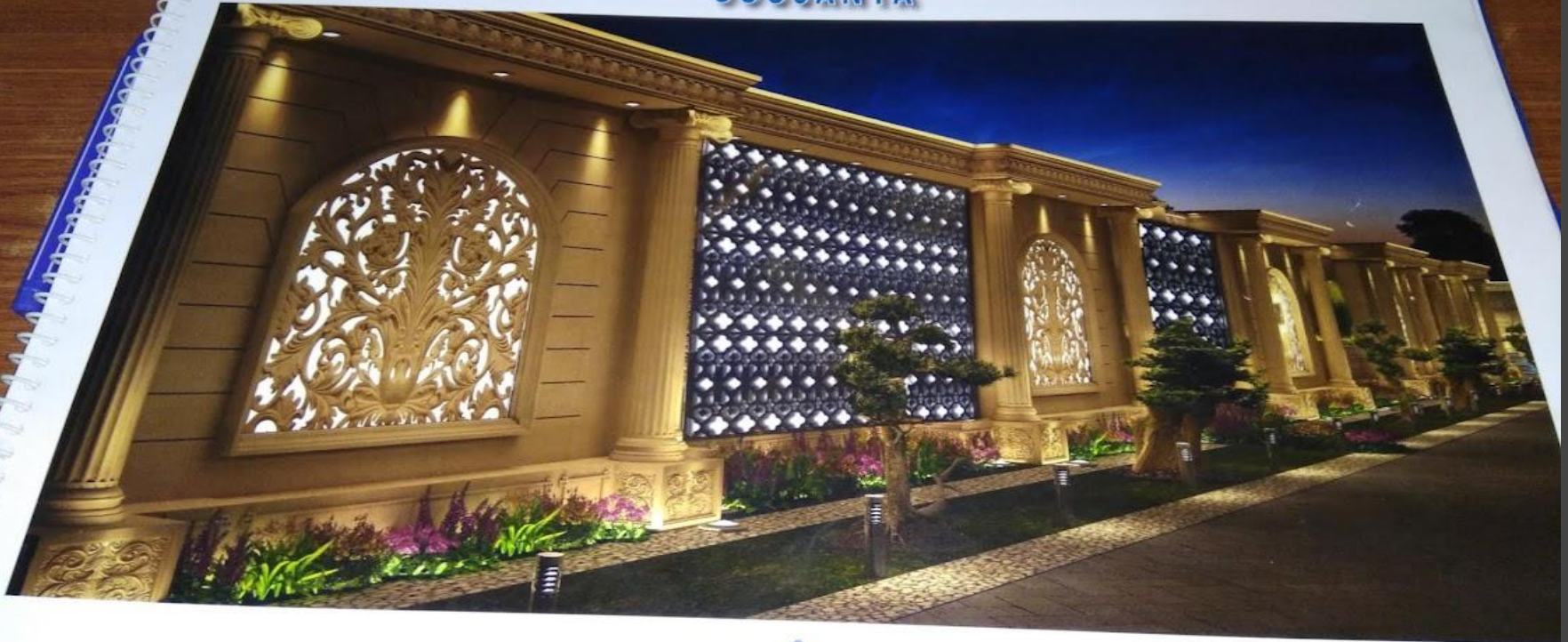
STONE CLADDING WITH GRC DETAILS



SOUJANYA - CHIEF MINISTER RESIDENCE



SOUJANYA



46

JALI & PANEL



SOUJANYA – CHIEF MINISTER RESIDENCE



THE HAVELI



VILLA AT JAIPUR



RUBBER & FIBRE MOLD



CORNICE AND COLUMN - VILLA AT BEED



GRC WORKS AT A VILLA



DECORATIVE PANEL PATTERN MAKING MACHINE



DECORATIVE PANEL PATTERN MAKING MACHINE



CORNICE CORNER ELEMENT



- IN THE EXTERNAL & INTERNAL CORNERS WE DO TAKE CARE TO CREATE EXTRA / SPECIAL MOULDS SO THAT THERE IS PERFECTION & SYMETRY TO THE CORNICE.
- NON OF THE MANUFACTURERS TAKE THAT EXTRA PAIN / COST TO CREATE THESE DETAILS.

FRP DECORATIVE PROFILE



GRC WINDOW SURROUND





THANK YOU

GFRC FACADES

SRIHARI NILKAR

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