

## Let's facilitate beauty

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### Abstract

Architecture is the manifestation of ideas through the process of abstraction. Pure Architecture has no boundaries, and it should be that way, as we need to shift our paradigm in the realm of reality. GRC is a material that has enabled us to achieve a new aesthetic along with construction efficiency. As a GRC firm started and operated by Architects, we strive to facilitate the production of good architecture by offering innovative solutions.

In one of our projects in India for Reliance Energy, Dahanu, we did the entire ceiling in stone finish GRC, as it could not be done in natural stone as it is too heavy and also time consuming. It is probably the only temple ceiling done in GRC. We were able to manifest the architect's manifestation as it is.

In another project, GRC enabled us to achieve an eclectic aesthetic combining the Greek orders with modern principles of design. Since the construction was in the modern column-beam format the Corinthian capitals along with cornices and 18 feet fluted columns were not load bearing. These hollow columns along with the other elements, were only possible in GRC. The 18 feet columns were casted only in pieces without any internal support. The project was accomplished while the school was functioning without disturbing day to day activities.

We want to further employ GRC in building construction by using it to make composite walls and ceilings. This has many benefits like low maintenance, re-usability, better aesthetic, faster construction etc. We wish to promote the use of GRC in the sub-continent and we want to do this while keeping in mind an architectural direction. We are in the business of facilitating Beauty

### INTRODUCTION

Humans started building with the purpose of shelter, to protect ourselves from the elements, but very soon building played a far more important role. Planning and construction became the testaments of civilisations. The built form represented the ethos of its epoch.

Vitruvius, the master builder, in his book de Architectura, suggested that a structure must exhibit three qualities of 'firmitas', 'utilitas' and 'venustas', implying the structures must be enduring, useful and beautiful. Structures, alongside serving a utilitarian role have been used as signifiers of power and authority. Architecture has made use of prevalent technology and materials of its age to evolve, conversely, the technology and materials evolved, to meet the imagination and ambitions of the people.

Architecture's role as an art form has grown over the years. Le Corbusier defined Architecture as an "Art above all others, which achieves a state of platonic grandeur, mathematical order, speculation, the perception of harmony that lies in emotional relationships. That is the AIM of Architecture."

Architects along with others have been working towards facilitating this aim. Art is the pursuit of beauty; therefore by extension Architects are in the business of Beauty. Architecture is a

means of expression, a way of telling a story, but in order to achieve this, it requires the right kind of skillset, tools, materials, technology and intellect.

Now, this is where GRC and the allied industry comes in. Over the years we have made tremendous progress in the fields of building technology, material sciences, conceptual tools and methods of abstraction. All the movements in Architectural history have been born out of the desire for new tools, new principles and a new outlook towards our world. We have constantly tried to break stereotypes and notions, setting new ones at the same time, but for all this we have to be imaginative.

In George Bernard Shaw's words "Imagination is the beginning of creation." Imagination spurs us on to think and invent ways of realizing our dreams. The concrete industry has played an important role in this pursuit. Its extension, the Glass reinforced concrete industry has allowed architects to be more imaginative, or rather it has allowed their imagination to become reality. GRC should not be thought of only, as an efficient replacement to the tools and materials already in place. Designers should think of it while designing buildings from the ground up and not as an afterthought.

If we look at the next generation of cars, the Porsche 918, the McLaren P1 and the Ferrari laFerrari, [Figures 1 & 2] they all make use of the latest technology. All three have a carbon monocoque chassis, hybrid engines etc. But what is interesting is, how these three are so similar in terms of the technology they use, yet so different in the way each one manifests. The technology facilitates the philosophy of its creator, thus bestowing each car with a unique character.



**Figure 1.** Porsche 918, the McLaren P1 and the Ferrari laFerrari

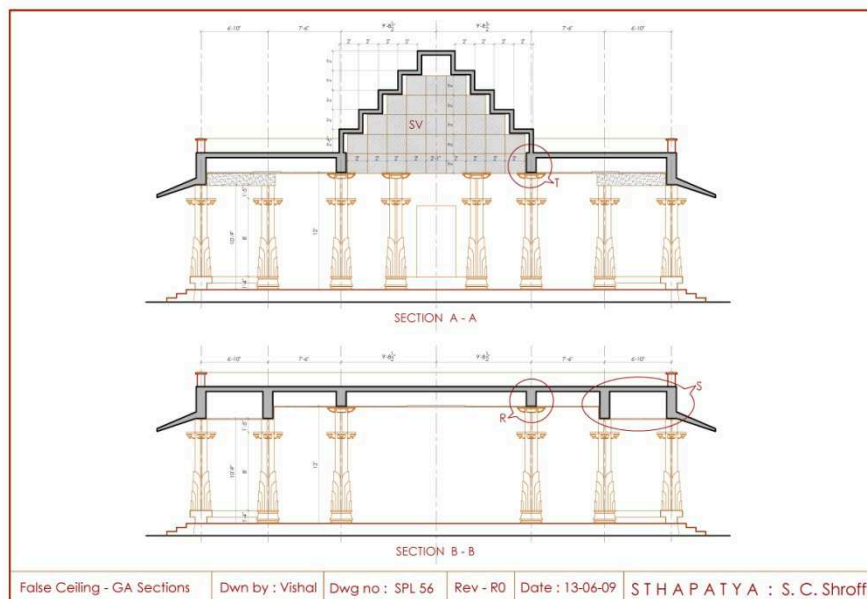


**Figure 2.** Porsche 918, the McLaren P1 and the Ferrari laFerrari

The versatility of GRC allows it to meet a myriad of design requirements. Costs can be controlled when GRC is a part of the design process. The designer combined with the expertise of the GRC manufacturer and installer give buildings a unique character. One can achieve fluidic forms and inflexions on the surfaces. The surface and the skin of the building comes alive, and GRC enables it to represent nuances. All new creations go through the process of Research, Design and Application. Active collaboration between various fields can help bridge the gaps between the three steps and make it an efficient and synergetic process without any loss of creative energy.

Our job is not just that of filling up BOQ's and catering to the requirements nor is it just doing things because we can and for the sake of better efficiency and producing better numbers; Although these things are vital to what we do, but above all we must remember that we are in the business of facilitating beauty. We are the collaborators that architects seek and we need to move forward with an aesthetic goal, constantly informing one another.

We would like to showcase couple of our projects. The first is a temple. The skeleton of the temple id constructed in RCC and it is clad in Bansi-Pahadpur stone. The exterior looks majestic, but the ceiling posed a problem. The Architect had designed an impressive Samosaran, (Inverted pyramid) [Figure 3]. Cladding the ceiling in stone meant that, it would become a long laborious process and would put immense load on the structural system. We were approached to provide with a solution.



**Figure 3. Samosaran**

The use of GRC panels for the ceiling simplified the process. Allowing for much faster construction and less load on the structural system. The correct use of pigments allowed us to get a finish similar to that of the natural stone used for the exterior. [Figure 4].





**Figure 4.** Use of pigments

We worked out the fixing details for the installation of panels. [Figures 5 & 6].



**Figure 5.** Fixing details

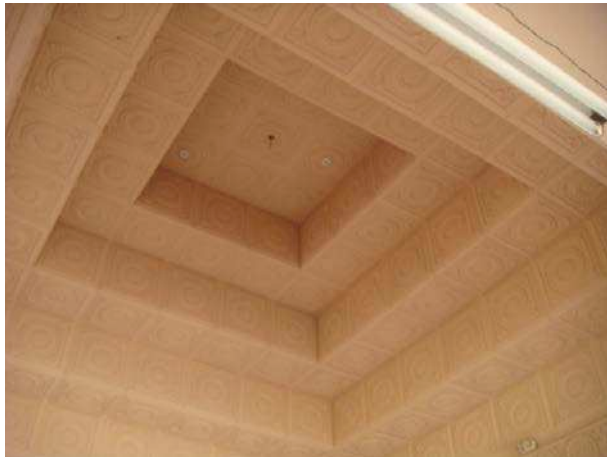


**Figure 6.** Fixing details

The installation required skill and precision. The use of GRC allowed us to achieve beautiful and awe inspiring aesthetic results. [Figures 7, 8, 9 & 10]



**Figure 7.** Beautiful and awe inspiring aesthetic results



**Figure 8.** Beautiful and awe inspiring aesthetic results



**Figure 9.** Beautiful and awe inspiring aesthetic results



**Figure 10.** Beautiful and awe inspiring aesthetic results

GRC can allow us to bring together multiple architectural styles or glorify just one style or create something unprecedented. Leading Architects like Zaha Hadid are making use of this versatile tool.

Our second project has an eclectic architectural style. Ar. K Thomas, the Architect appointed by the MOCCB group for their Mar Theophilus School in Dhanori, Pune, envisioned a Modern structure, which would reflect the ethos of the past. A building based on modern design principles of design, but upholding the aesthetic orders of the past with the same grandeur. He wanted to make use of the Greek orders used in Greek temples for this temple of Education. The columns were to be placed on a higher level, enveloping the façade, as if they were floating in the air, for everyone to see from a distance. [Figure 11]



**Figure 11.** Mar Theophilus School in Dhanori, Pune

The problem – weight. The massive weight meant that it could not be done in concrete. The solution - to do all the elements in GRC, which would also give them a much better finish. We collaborated with the design and the design went through a series of subtle changes. The architect went ahead with the Corinthian order.[Figure 12].



**Figure 12.** Columns



The correct proportions and details were meticulously worked out. The use of GRC allowed the architect to be ambitious. We had in front of us a grand design, now we had to execute it. [Figure 13]



**Figure 13.** Executing the grand design

The total weight of a single assembly of elements, which included the Base, Column, Capital and the cornice was less than a ton. It was light by no means light, but it was only a fraction of the weight, RCC would have been. This meant lesser load on the structural system of the building. We were confident that there was no need for any additional steel support; concrete being good in compression, the assembly was simply supported on the bottom slab and the wall behind it. [Figure 14]



**Figure 14.** Simply supported column

The task of erecting the columns was far from easy, in fact it was a lot more difficult than it seemed initially. Alignment was crucial for a clean aesthetic look and correct load transfer. The laborers had to be skilled and trained and the project required personal supervision. [Figures 15 &16]



**Figure 15.** Skilled laborer



**Figure 16.** Skilled laborers

Initially the fluted column was cast in four pieces. At first all the four pieces were individually lifted and assembled. As this was taking more time, the 2 bottom pieces and the 2 top pieces were joined on ground and then erected with the help of a crane. In order to reduce time further and eliminate the joint in the middle of the column, the mould was re-made and now the column was cast only in 2 pieces - the back and the front. The column along with the base, the capitals and cornices were erected with the help of a crane. [Figures 17 &18].



**Figure 17.** Erected with a crane



**Figure 18.** Erected with a crane



As a result, this postmodern back façade comprising of five columns was erected in only 2 days. [Figures 19 & 20].



**Figure 19.** Postmodern back façade comprising of five columns



**Figure 20.** Postmodern back façade comprising of five columns

Thus, the use of GRC allowed us to create a beautiful façade in very less time. [Figures 21 & 22]



**Figure 21.** Beautiful façade

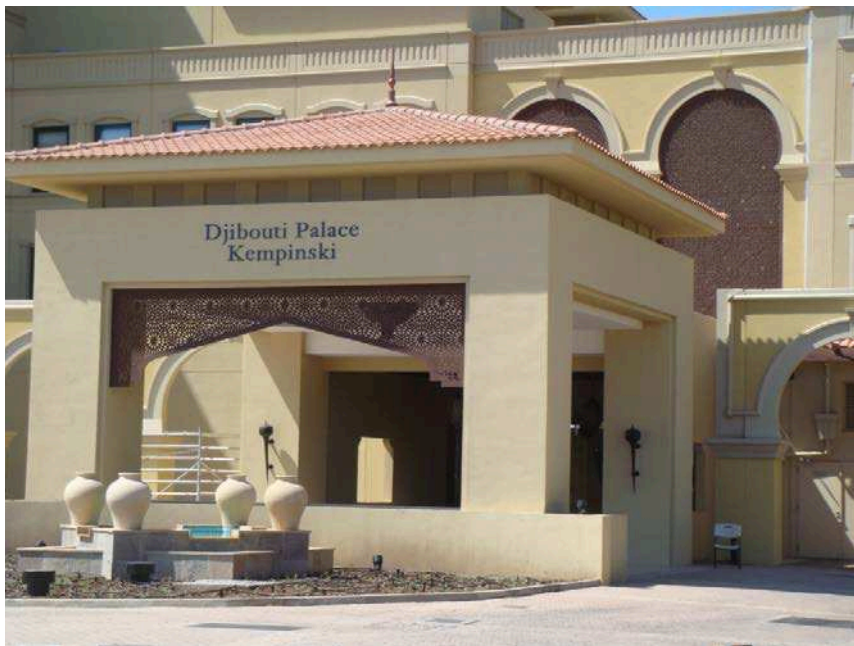


**Figure 22.** Beautiful facade

We are aware that similar, in fact more massive projects have been done in other parts of the world and we were privileged to be a part of one such work in Djibouti for the Djibouti Palace Kempinski, [Figures 23 & 24] built by Taisei corporation, but in India this was a first, this is pioneer work in India. India is slowly but surely learning the use of GRC and other materials. Not just as a replacement or an alternative material, but as an integral tool in the design process itself. Our role is to be a part of this process to manifest ideas, and therefore facilitate beauty!



**Figure 23.** Djibouti Palace Kempinski



**Figure 24.** Djibouti Palace Kempinski,