

Specialized Roof Mounting- Challenges and Optimal Solutions



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Rooftop systems in emerging markets are driven more by incentive than innovation. While there is not much scope for innovation in Modules and Electricals, there is a ample unexplored scope for innovation in Mounting Structures. At the same time there are umpteen challenges in Rooftop mounting which need to be addressed by optimized designs.

Rooftop Mounting can be categorized into three major forms namely Flat Roofs, Inclined Roofs and Car Ports. Each of these has their own set of challenges which spiral down into the problem of ensuring optimal blend of standardization and customization. This article explores the question of optimization in rooftop mounting. Each segment will be considered as case study based on Nuevosol's experiences in recent projects.

Concrete Inclined / Flat Roofs

Main parameter for optimization in Flat roof mounting is area usage, which eventually narrows down to the question of anchor free or anchored roof mounting. Pros of anchor free mounting lie in standardization and ease of installation where more than 100kWp can be installed in a day. Modular structures have low ground clearance and space beneath the structure goes non-useable after installation. While modular roof mounting structures give the flexibility to configure area usage optimally avoiding shaded spaces but having disadvantage of non-usability of roof after

Photo: 100kWp Nuevo Fix- Non Penetrative Rooftop Mounting System in Mumbai installed on a Skyscraper.



installation. In anchorage structures one finds lot of free space under the modules to use it for inverters and other storage purposes.

One major challenge of installing a solar mounting structure on a concrete roof is ensuring proper anchorage to the existing structure. As far as possible optimal designs insist on an anchor free structure

such as our product Nuevo-Fix. Anchorage can compromise with the integrity of the existing structure due to heavy windloads caused do the elevation which is avoided in the low rise anchor free structures.

If a heavy elevated structure has to be installed on the flat roof, we insist on using the column post of the mounting structure to



be located only on the column/beam of the existing structure. This will ensure proper anchorage depth availability and also the loading on the mounting structure will be transferred to the load bearing members of the existing concrete structure. Also one has to bear in mind that the anchors available in the market insist on anchoring in the concrete. Many installers fail to foresee that a typical flat roof have 40mm to 100mm of Mortar finish for waterproofing and drainage purposes. This layer needs to be chipped locally to reach the actual concrete before anchor holes are made. Fail to do the same and you are risking the structural integrity of the mounting system as a whole.

While this being the question of anchoring vs anchors free installation, the main problem of customization vs standardization remains of key importance. In recent times we have witnessed a major rise in demand for rooftop mounting and simultaneously a rush for customization. The problems of customization are difficulty to fabricate or maintain inventory and hence making the cost unviable. Standardization brings in economies of scale and optimized manufacturing for Just in Time delivery but it has its own set of cons as mentioned above. Advantages of anchor free standardized

modular structures have been outweighing that of the anchoring type.

Metal roof top

Captive power being the necessity of the hour industrial metallic Rooftop Projects have seen a drastic rise in the recent times. Mounting on trapezoidal roof profiles has been a standard affair in Europe and US for years, but is only a recent phenomenon in India. This calls for immense caution in using the industrial roofs to ensure integrity of existing structure and other safety norms of water proofing.

Primary challenge in providing a metal roof top solution is ensuring structural integrity of the existing structure post installation of the modules. If you are not sure of the load carrying capacity of your existing structure, insist on a carpet style installation of modules as this will not increase the wind loading on the existing structure. Extreme care must be taken to ensure that the mounting system will not hamper the water proof quality of the metal roof. Failing to take care of these aspects will be detrimental to the life cycle of the building. Once installed mounting system must be free of any maintenance for the lifetime of the solar plant and the

building, as maintenance on industrial roofs has inherent risks.

Various solutions like using the underlying truss structure or clamping the metallic roofs are all viable depending on the health of the existing structure.

Car Ports

Model: 50kWp Installations of Car Port Structures in Hyderabad

Coming up with a cost effective and eco friendly car parking structure comes with challenges of its own. Firstly one has to solve the problem of what kind of car parking arrangement results in the most economical structure. Thanks to our internal research we have observed that structures with two cars abreast per bay result in optimal usage of structural steel. The number of components used in the making of a solar car parking structure is usually higher when compared to the structures of a regular solar farms. Also aesthetic appeal of the structure must also be looked into.

We have translated our learnings from our uniquely designed uni-pole structure used for solar farms to our latest uni-pole car parking structure. This uniquely designed uni-pole car port reduces the entire structure into only 5 components and 4 types of connections, thus facilitating easy fabrication and also faster installations.



Pivotal role of Mounting in Rooftop Systems

While mounting structures for Solar Farms play a crucial role in ensuring grid parity and sustainability, it can be comfortably claimed that mounting structures are pivotal in roof mount systems. There is no rooftop system without a viable mounting solution. This being the case one should apply caution in designing these structures ensuring all the parameters of safety and durability are considered without going for hasty execution. At Nuevosol the research team continuously develops various systems for roof mounting with an optimal blend of customization and standardization.