Modular Construction of Stone Panels

Traditionally, the use of natural stone presents significant manual handling challenges to the construction team. Early design work enabled the weight of the stone sets to be minimised by reducing the thickness of the stone from 100mm to 75mm. However, the larger blocks still weighed up to 72kg and therefore had to be lifted mechanically to comply with manual handling regulations. In addition to this the blocks had to be transported across construction areas and up the building and then across scaffold platforms to their point of use. Not unlike a giant jigsaw puzzle, each stone had its own place in the building and so much work had to be put into marking up and storing each pallet of stone so that it could be easily retrieved when it was delivered to site. Although this could be managed, there were still significant health and safety issues associated with this work.

The project team discussed this issue as part of the design risk assessment process and challenged the status quo. A solution was put forward where the stone would be pre-fabricated in a workshop environment in large panels. The team approached a specialist pre-cast concrete company. One of the major concerns was that the quality achieved by hand laying could not be matched in a prefabricated panel. Sample panels were constructed which satisfied these concerns which left the way forward for the panels to be manufactured. The panel size is only limited by the lorries which travel by road. They are lifted off the wagons and bolted directly onto the steel structure of the building

This new work method eliminates all of the manual handling risk by utilising mechanical means to lift the panels. The panels can be bolted onto the structure from within the confines of the steel structure or where this is not possible from within the confines of a mobile elevated work platform (cherry picker) thus eliminating a large amount of working at height. Also, the hazards associated with constructing the panels are far easier to manage in a factory environment which specialises in this work.

Apart from the early health and safety drivers, other benefits have also been realised. The fact that the panels arrive and are erected immediately reduces the need for storage, which is always at a premium, and reduces the potential for damage through double handling. The system is also vastly quicker than hand laying the stone blocks which reduces the programme time on site. Lastly, but not least, the process of installing the panels is far cheaper than hand laying especially when scaffold and lifting equipment requirements are taken into account.