**TITLE :**
Report on the load properties of a Structural Insulated Panel System (SIPS), product samples supplied by Atlas Roofing, when used as a roofing material and exposed to UDL and Point loads on top of the structure as well as wind up lift simulation

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## 1 Introduction

The purpose of this investigation was to:

- Assess the structural strength of the Structural Insulated Panel System (SIPS) when used as a roofing material and exposed to loads on top of the structure.

- Testing of the potential wind uplift of the SIPS structure was also carried out.

- A further test was carried out to assess the potential load the SIPS product could carry when placed on a point load.

## 2 Description of material

The sample tested consisted of 1200x1200mm x 80 mm thick layer of 35 Density yellow rigid polyurethane with a 9 mm thick Magnesium Oxide board laminated below and a 11 mm thick Oriented Strand Board (OSB) laminated to the top. In practice a layer of 'torch-on' waterproofing would also be fixed to the external side (on top) of the panel (i.e. onto the OSB) but the objective of the test was to evaluate the performance of the panel when subjected to structural loads on top of the structure (i.e. impacting Structural Insulated Panel System (SIPS); hence the waterproofing was omitted for the test specimens.
A lip channel with size 75mmx50mmx20mmx2mm was fixed onto the bottom of the Magnesium Oxide board using 10nox 115mmx5mm Waiver head Tex screws. The lip channels were fixed on both sides of the SIPS board to act as "support" during the load tests and in this way simulating a typical site installation.

## 3 Test method (The tests were done with the SANS10160-2 protocol in mind)

## 3.1 UDL

The SIPS material was installed onto the lipped channel test frame.  As mentioned, the magnesium oxide board faced downwards. The test frame was placed on the ground.

***Fig 3.1.1 shows the start of the UDL test***

Deflection of the SIPS panels were measured during the investigation with a measuring tape after each 100kg were loaded. The test installation was exposed to increments of 50 kg bags of cement loaded onto the panel by hand. Deflection was continuously recorded and observations were noted of the behaviour of the material.

***Figure 3.1.2: Test  reaching 650kg on top of SIPS panel***

*The deflection measured over the 1200mm length was 4mm with a 650kg load. Afterwards the load was removed and the board went back to normal.*

## 3.2 Wind uplift (Negative Pressure)

The SIPS material was turned upside down (inverted)

***Figure 3.1.3: The SIPS panel invert for wind uplift simulation***

Once again loaded and measured to ascertain the maximum load capacity. It is required that Wind uplift mass should be at least equal the UDL.

***Figure 3.1.4: The SIPS fully loaded with 900kg***

## 3.3 Point load

## A point load test was done using a 100x100mm wooden block, placed on the SIPS panel. The cement  bags were placed on the wooden block

***Figure 3.1.5 The SIPS panel loaded with 600kg on point load***

*The bags were removed to examine the impact on the OSB board and SIPS panel in general*

***Figure 3.1.6: The 100x100mm point load after removing the 600kg load***

# 4 Conclusions

To follow