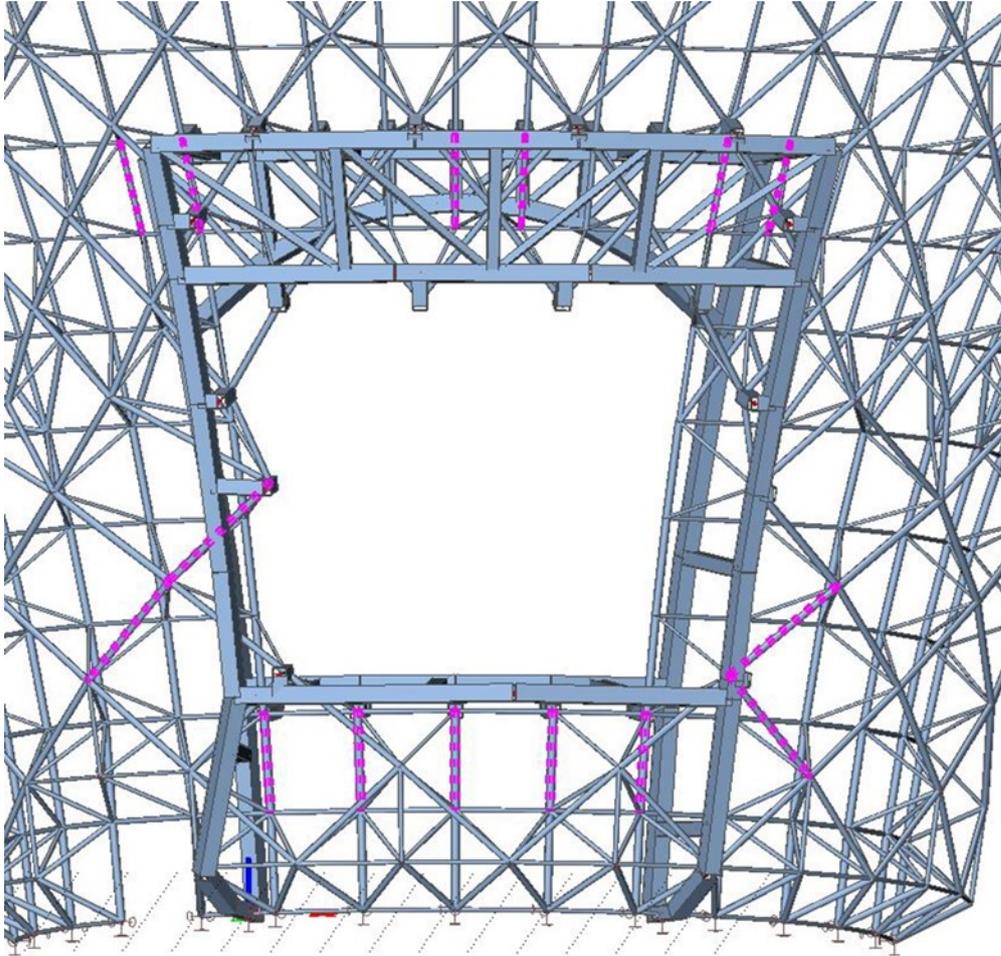


Strain Gauge Application—Ferrari World, Abu Dhabi, United Arab Emirates



DuSense were contacted by IEMANTS to provide service for installation and monitoring of a Steel structure during construction works over a period of 3 to 4 weeks.

19 nos strain gauge locations were selected on the tubes and sleeves for the Funnel support structure.

Single element electrical resistance strain gauges by Kyowa Type KFG-5-350-C1-11 were installed at 19 no. locations, 15 no. on the tubes to measure axial strain and 4 no. on the sleeves also to measure axial strain direction.

The strain gauge has a 5mm gauge length. The tube locations were positioned approximately 1x to 2x diameter away from the end of tube.

The portable strain indicator is made by Vishay US, a precision electronic instrument type 3500 which comes with self-calibration function, it uses an Ultra High Precision resistor to switch a fixed 5000 microstrain shunt across the connected gauge to simulate a strain signal to test the accuracy of the gauge. It is used at start and end of monitoring to confirm the readout is operating accurately.

Other basic checks performed to confirm the installed strain gauge is functioning correctly include –

- Electrical loop resistance to confirm the 3-wire circuit resistance is as expected 350ohm or 0 ohm depending on whether P+, S- Or D350 wire.
- Electrical insulation resistance to confirm there's good insulation resistance between gauge and ground, typically >5Megaohm is acceptable.
- Strain balance when connected to the P3500 to check the reading is stable and within acceptable range. Stability depends on how much variation in stress within the structure at the time of measuring. Normally in a static test such as this the last digit should be stable to within $\pm 1\mu\text{strain}$.

The installation of the strain gauges was completed by extremely experienced strain measurement engineer (40+ years), in United Kingdom and Middle East. The full strain gauge makers' installation procedures and materials were followed at every stage to ensure good functionality of the gauges.

The strain gauge locations were marked-out and steel surfaces were prepared to a 400 grit chemically clean and dry surface ready for gauge installation.

The strain gauges were bonded at the locations shown in attached diagrams using the manufacturers recommended adhesive a cyanoacrylate adhesive type C33A also made by Kyowa.

The strain gauges were wired using 3 wire quarter bridge to provide enhanced temperature and cable length compensation which provides reliable accurate strain data.



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