terrasol

setec

Energy and Industries
Automotive

Foundations for a driverless vehicle simulator

Dynamic and vibratory response of the simulator foundations

2018 - 2020

FRANCE

Client

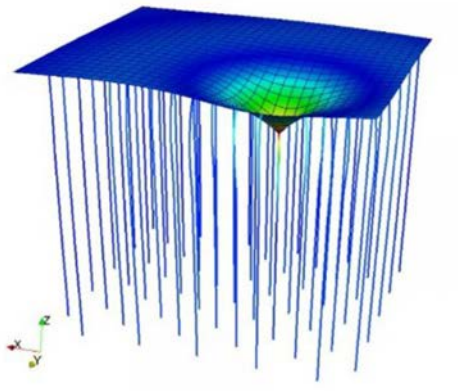
GROUPE RENAULT

Terrasol's services fees

55 k€

Owner

DISG France - Groupe Renault



The Project

This project comprises the construction of a driving simulator for the development of future driving assistance systems and driverless vehicles (ROADS Project) for Grroupe Renault at Guyancourt Technocentre (78)

The heart of the installation is a simulator recreating all the possible movements of a vehicle in its environment.

This simulator can accommodate a vehicle with passengers on board (total mass of the assembly 90 t). It operates on a reinforced concrete slab of plan dimensions 32 m x 25 m.

Key features

- Validation of the vibrational criteria of the project during the design phase
- Definition and monitoring of a vibration test campaign
- Validation of theoretical models used in the design phase using vibration measurements
- Retro-analysis using more sophisticated theoretical SSI models

Our Services

Terrasol's assignment: qualify and validate the dynamic and vibratory response of the simulator foundations in relation to the performance criteria imposed by the manufacturer Boschrexroth.

To comply with these criteria, the design moved towards a 32m x 25m x 1.50m raft foundation solution (total mass of 3 000 t) resting on a group of 55 piles with a diameter of 1m. The initial qualification phase was based on "hybrid" modelling using SASSI software, by considering the dynamic slab-pile-soil interaction effects. The dynamic behaviour of the soil was characterized using a Cross-Hole test campaign that was conducted beforehand.

Once the pile work had been completed and the slab had been cast, Terrasol supervised the vibration tests conducted on the slab using an unbalanced machine and a very high-precision acquisition system. The test results validated the dynamic performance of the slab with displacement and velocity amplitudes close to those estimated by the "theoretical" models. In particular, in-situ measurements confirmed that a significant group effect exists, resulting in a reduction in the overall stiffness by about 3 to 4 compared to an approach ignoring any pile interaction via the surrounding soil.

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