



## Design of multi-storey buildings for transportation

Jim Martin, Danilo Marino, Tyrone Miller, James Bingham

WSP, London & Basingstoke, UK

Contact: [jim.martin@wsp.com](mailto:jim.martin@wsp.com) [danilo.marino@wsp.com](mailto:danilo.marino@wsp.com) [tyrone.miller@wsp.com](mailto:tyrone.miller@wsp.com) [james.bingham@wsp.com](mailto:james.bingham@wsp.com)

### Abstract

Self-Propelled Modular Transporters (SPMT) are commonly used to lift and move relatively heavy and rigid structures such as oil platforms and bridges. The aim of this paper is to show how to design and analyse a conventional multi-storey building for transportation by SPMTs. The case study is the design of a major international airport pier to be built outside the secure airport perimeter and moved to its permanent airside location using SPMTs. Large scale modular construction methodologies have been adopted to maximise the reuse of the same transport beams and transporters for each module.

The benefits of this approach for this project are to ensure the majority of the construction activities can take place on a landside site rather than airside. By eliminating the security checks and subsequent transporting of workers this can save in the order of 4,000 workdays, 2,000 bus journeys and associated security and escorting costs. Furthermore the airside area of the airport is not sterilised by long term construction activities resulting in a 6 month benefit to the delivery programme.

**Keywords:** Modular; transportation; SPMT; Large Scale Modular (LSM); multi-storey buildings.

### 1 Introduction

Self Propelled Modular Transporters (SPMT) are widely used in the construction industry to transport heavy loads into constrained or dangerous sites and locations. They consist of modules of 4, 5, 6 or 8 axles fixed together into trains to form a platform. The axles are controlled hydraulically to lift loads up to 60cm and with the possibility to steer the axles through 360 degrees it allows the movement of the load in almost any direction.



Figure 1 SPMT train with power pack

There are many examples of the use of SPMTs in the industrial and offshore sectors. In the industrial sector large installations can be constructed and commissioned offsite. In the offshore sector they are often used to move heavy loads on and off barges to allow decommissioning on land.



Figure 2 Industry image