

Lightweight Truck Specification Generates Savings for MEMS

Case Study



- Company:** Hardstaff Group
- Location:** Gillingham, Kent
- Fleet Size:** Flatbed Rigid HGVs: 2
Support Vehicles: 2
Rigid HGVs with Lorry Mounted Cranes: 7
HGV Tankers: 4
Trailers: 30
Artic Units: 3



Introduction

Careful attention to correct vehicle specification can maximise operational efficiency and increase profits. Increasing the payload of a vehicle can have a dramatic effect on fleet performance. For generator supplier MEMS Power Generation (MEMS) it meant using just one vehicle instead of two per delivery. Reducing the number of lorries means lower mileage, less fuel usage and ultimately, lower CO2 emissions. Read on to discover just how MEMS have successfully improved their operations through effective vehicle specification.

MEMS Power Generation specialise in the hire and service of diesel generators. This Case Study highlights the benefits that MEMS achieved by reducing the weight of the truck chassis and auxiliary equipment resulting in an increased payload. MEMS were looking to reduce the number of trips required for each diesel generator delivery they handle. By doing this they wanted to reduce their mileage, fuel usage and ultimately decrease their expenditure.

For MEMS it was critical to incorporate weight savings. With the heavy generator and cabling equipment, MEMS were already close to the gross vehicle weight limit for rigid vehicles of 32 Tonnes, so every possible weight saving would be beneficial.

The company considered a number of options including multiple trips for auxiliary equipment deliveries, lightweight cranes, chassis extensions and the greater use of articulated vehicles. In the end, through a working relationship with Volvo, Colliers Truck Builders and Walker Cranes, the most effective payload increases were achieved by specifying a specially designed lightweight chassis with auxiliary equipment. Table 1 below shows a summary of the benefits of introducing just one lightweight vehicle to the fleet.

Table 1 Key Benefits of Introducing 1 Lightweight Vehicle Over a 2 Year Period

Deliverys	229 fewer trips made
Man Hours	1,374 man hours saved
Fuel	28,625 Litres saved
Payload	1.7 Tonne increase
MPG	2 MPG increase
CO2	75 Tonnes saved

Chassis Theory

The purpose of the chassis is to locate the axles, power unit, running gear and cab to form the structural skeleton for the engine drive train, fuel tanks and batteries. The chassis is the fundamental platform on which the vehicle is designed and essentially has two longitudinal steel channels with a series of cross-members.

The standard chassis is made from steel making it strong and suitable for both on and off road driving. Factors of consideration should be the number of axles, the body length / size and ancillary equipment for example cranes, grabs and lifting gear.

For vehicles operating certain equipment, such as cranes, or those operating under severe

conditions, choosing a chassis with relatively high torsional stiffness may be advantageous. For a vehicle operating off-road, a flexible body mounting is recommended to cope with chassis flexing.

A lightweight chassis is made from alternative materials, such as aluminium or thinner gauge steels. Alternatively, a normal grade chassis can be used and modified by using weight saving elements, providing these are authorised by the manufacturer.



MEMS

MEMS Overview

MEMS Power Generation have one of the most extensive diesel generator rental fleets in the country with the entire rental and delivery solution being controlled in-house. Their extensive transport and refuelling fleets together with a dedicated hire office allows their specialist team to respond immediately to almost any power emergency 24 hours a day, every day of the year, providing a genuine emergency service. MEMS provide silenced diesel generators for hire, available and ready for immediate dispatch. They run at the heavy end of their sector, each industrial generator can weigh over 10 Tonnes per unit. In addition to the generator, the heavy cabling is also taken to site, each cable set (2 cages) weighing approximately 330kg. Due to the weight of the generators and additional auxiliary equipment, a number of the operations require 2 vehicles to supply the generator to the client. The first truck carries the generator and a second vehicle, which might be either a 7.5 Tonne or 19 Tonne truck, carries the cable cages plus auxiliary equipment.



Customer satisfaction is a key advantage in a competitive industry sector. By maximising payload and reducing the number of vehicle trips from two to one, clients are not inundated by vehicles.

MEMS have also entered into a carbon off-setting program to bring their impact on CO2 emissions to zero. It is something they work hard to maintain and are always looking for initiatives to lower CO2 emissions, even offering their customers the chance to offset the carbon footprint created when the diesel is burnt during generator hire.



Ian Coffey, MEMS Logistics Manager

MEMS Fleet and Their Operations

Existing Fleet

MEMS operate a mixed fleet of rigid HGVs, rigid HGVs with lorry mounted cranes, articulated tractor units and flatbed trailers and a variety of support vehicles including refuelling tankers, road tow fuel tanks, fuel bowsers and Landrovers. The entire fleet covers approximately 3,000km a day. Since June 2006 MEMS have invested £3.4m in the entire rental operation.

Due to growth in the supply of the larger generator sets MEMS expanded its fleet of 21 HGV trailers by purchasing 7 new articulated trailers and 2 fuel bowsers. In 2006 the company invested in a lightweight Volvo FM 32 Tonne rigid truck and in April 2007 they commissioned two further 32 Tonne lightweight vehicles.

Improvements

MEMS felt that to optimise their operations, they needed to reduce the number of trips that require 2 vehicles per delivery. Initially, MEMS tried to implement a strategy of multiple trips to provide cables and auxiliary equipment on one truck for several sites located within close proximity. This system appeared to significantly reduce the overall number of trips, however, they encountered some disadvantages e.g. delays with deliveries and the high risk of cables being stolen. These had a direct impact on customer satisfaction and company costs.

Searching for a better solution than multiple cable deliveries from one vehicle, MEMS commenced a feasibility study in 2006 to reduce the unladen weight of the truck allowing it to accommodate the generator and auxiliary equipment at the same time.

MEMS considered a wide range of truck manufacturers as potential suppliers for the lighter chassis. Working with Walker Cranes (supplier of the chosen FASSI cranes) they established a list of criteria and specifications for their preferable truck including minimum carrying capacity, lifting capacity, physical dimensions and no chassis extensions. Following

in-depth market research on available alternatives, they decided to select an offer made by Volvo which presented the closest model of the chassis to the required specifications.

Volvo tailored the lightweight chassis specifically to the needs of MEMS. The entire feasibility study and specification process took 7 weeks.

The chassis design, wheels and lorry mounted crane were all specified to minimise unladen weight and maximise payload

In 2006 MEMS invested in their first lightweight Volvo FM 32 Tonne rigid vehicle, supplied by the local Volvo dealership MC Truck and Bus. They opted for a rigid vehicle rather than a larger articulated vehicle due to the enhanced stability and manoeuvrability it could offer.

The chassis design, wheels and lorry mounted crane were all specified to minimise unladen



weight and maximise payload, giving an extra 1.7 Tonnes of payload. This gave the company the confidence to specify a further 2 vehicles in 2007.

“Using the state of the art FASSI Installation Programme we were able to increase the size of the crane to 60 Tonne metre without compromising chassis strength or flexibility. This was not previously possible using a heavier chassis and subframe.”

Tony Hitchcock, Walker Cranes Sales Director

Chassis Design and Vehicle Specification

Chassis Design and Features

The chassis is a bespoke design specific to MEMS' requirements. The design itself is a normal grade chassis with a frame section thickness of 8mm and a flange width of 90mm. Its front section is widened to accommodate the cab and engine.

Weight saving gains come from the elements that are added to the chassis such as the i-shift gearbox, alloy wheels, disc brakes and the air suspension. However, major weight savings have been attained by Colliers Truck Builders who add the necessary subframe for the lorry mounted crane. The subframe must be strong enough to cope with the mounted cranes provided by Walker Crane Services.

The subframe has been manufactured using a lighter gauge metal which has reduced the weight without compromising the stability of the chassis - the vehicle still attained a 100% load test with the thinner metal subframe without flexing. Colliers achieved this saving via an independently verified trial and error process which gradually reduced the thickness of the subframe from the normal 10mm. The strength required for the lorry mounted crane and the ability of the frame to stop chassis twisting were not sacrificed in this weight reduction process.

Additional Efficiency Features

The MEMS light weight vehicle also features a number of additional safety and efficiency related features.

The lorry mounted FASSI crane has a 'power on demand' function which allows the crane to remain idle until the operator moves one of the control paddles on the radio remote control box. The engine speed then instantly increases to working speed and remains at that speed whilst the operator controls the crane. If no control is moved for 3 to 4 seconds the crane returns to idle speed, saving fuel, reducing CO2 emissions and reducing noise levels.

The engine meets EU exhaust emissions requirements according to Euro 5 standards. These requirements have meant that necessary additions to the chassis add weight to the overall structure. Despite this additional weight the vehicles still achieve the required carrying capacity and still cut one vehicle out of the loop per job. This goes some way to demonstrating

that legislative requirements need not mean increased costs for the company if a carefully considered truck specification is adopted.

The Volvo cab is aerodynamically designed with smooth surfaces and rounded corners. It has tailored air flow systems and a complete chassis skirt, all contributing to the efficiency and profitability of the vehicle.

In addition to this, MEMS maintain that any new vehicle developments are not at the expense of safety, for example, each new vehicle has foot pads located by each crane leg. These act to disperse the weight of the crane load, reducing the pressure placed on each leg.

Light Weight Vehicle - Cost Savings and Benefits

The newly developed lightweight vehicles are only 1.5% more expensive to purchase than the standard heavier vehicles. Combined with the fact that there is no difference in maintenance costs between the standard and the lightweight vehicles this has realised significant savings for MEMS.

Over the 2 years that the first lightweight vehicle has been operating, fuel efficiency has improved notably from 9 miles per gallon (MPG), to 11 MPG resulting in significant cost savings.

Payload has increased from 10 tonnes for the standard vehicle to 11.7 Tonnes for the lightweight vehicle. This increase of just 1.7 Tonnes has meant the difference between using one and two vehicles per delivery. The combination of the lightweight features have resulted in significant savings in weight, money and CO2 emissions.

Since introducing the first lightweight vehicle into the fleet 2 years ago, 28,625 litres of fuel have been saved on deliveries of the bigger generator sets. That works out to a 75 Tonne saving of CO2 (based on 2.63kgs of CO2 per litre) over the 2 year period. The numbers of trips have halved, effectively saving 1,374 man hours and with the addition of a further 2 lightweight vehicles to the fleet these savings look set to increase.

It is also important to point out that by fitting Euro 5 engines to all of the newly specified vehicles MEMS have made savings on their road fund licenses due to the environmental benefits of the cleaner engines.

Taking into consideration the additional costs of the lightweight vehicles MEMS have stated that the payback period for the lightweight vehicles is 2 years.

“The time and effort we invested in developing the exact performance criteria and specification for our new vehicles has paid off in a remarkably short time-frame. The development and purchase costs have been covered in just two years.”

Ian Coffey, MEMS Logistics Manager




Conclusions and Recommendations

For a company operating or transporting heavy equipment, it is worthwhile bearing in mind the savings that MEMS have made simply through efficient and effective truck specification. Payload was the prime bottleneck within the MEMS fleet and by investigating their options they were able to come up with a successfully tailored solution. A seemingly small factor can result in large changes like halving the number of trips in an operation.

A bigger payload equates to fewer trips, saving operators costs in terms of fuel used and vehicles and drivers required in the operation. Ensuring vehicles are closely matched to the tasks they are expected to perform will improve both fuel efficiency and overall operational efficiency leading to:

- ➔ Cost savings
- ➔ Increased profitability
- ➔ Reduced environmental impact
- ➔ Improved customer service
- ➔ Improved safety
- ➔ Increased distribution efficiency



See the Freight Best Practice publication **Truck Specification for Best Operational Efficiency** for further information on the process of correctly specifying an efficient and 'fit for purpose' vehicle. These and many other publications can be ordered **FREE** of charge by calling the Hotline

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Developing - SKILLS

Companies and Drivers Benefit from SAFED for HGVs: A Selection of Case Studies

This selection of case studies describes the benefits experienced by 15 companies and their drivers who have taken part in the Safe and Fuel Efficient Driving (SAFED) scheme.

Transport Operators Pack - TOP

TOP provides practical 'every day' support material to help operators implement best practice in the workplace and acts in direct support of tasks essential to running a successful fuel management programme.

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Truck Specification for Best Operational Efficiency

A step-by-step guide to the process of correctly specifying an efficient and 'fit for purpose' vehicle.

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There are over 25 case studies showing how companies have implemented best practice and the savings achieved. Check out the following selection of case studies:

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