

MAN – NFG “New Generation of Driver's Cab”

The project “MAN - NFG” began on 12th February 1996 and was officially completed on the occasion of the visit to MAN on 30th October 2002.

Wilhelm Karmann GmbH was the largest individual supplier with a project turnover of more than 120 million euros.

A completely newly developed vehicle was introduced during the presentation of the MAN TG-A for the top segment of the heavy duty commercial vehicle market at the Munich Olympic stadium on 24th March 2000. It's an addition to the F90/F2000 Generation Series which has been in production for 15 years.

When the MAN-F2000 series was rolled out at the International Motor Show 1994 in Hanover, the new development of the successor had already begun under the project name “NFG” which can be translated into New Vehicle Generation.

The project consisted of the complete new development of a vehicle generation with front wheel drive in the classes of 7,5 to 40 tons maximum laden weight for right and left hand drive vehicles.



The vehicle was already presented to the public on 24th March 2000.

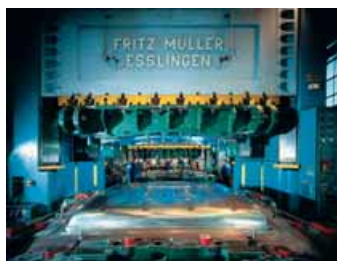
Scope of Work

According to the design and model specification from MAN, Karmann developed the body-in-white of the driver's cab. The scope of work included was, among others, *design* of the single parts, the necessary *crash and durability analysis* and the building of approximately *50 prototypes* in diverse variations. The *entire range of equipment* was developed and built by Karmann.

Karmann was responsible for the *planning, design and manufacture of the 221 press tools and 40 interchangeable elements* for the production of the

stamped parts for the body shell of the driver's cab. All stamping tools are now installed at two MAN production sites for the series production.

Furthermore, Karmann was also responsible for the *planning, design, manufacture, try out and commissioning of seven sub-assembly systems in addition to two complete body-in-white systems* for the production of complete assemblies out of these sub-assemblies.



Karmann focused on the development of:

- reduction of weight
- increase of active and passive safety
- enhancement of customer use/quality optimisation
- enhancement of comfort
- improvement of cost situation
- reduction of number of parts in total modular system
- reduction of number of parts in individual variation
- reduction of variations
- multi-functionality of individual parts
- application of innovative material and manufacturing technologies
- reduction of production time.

In order to accomplish the goals of

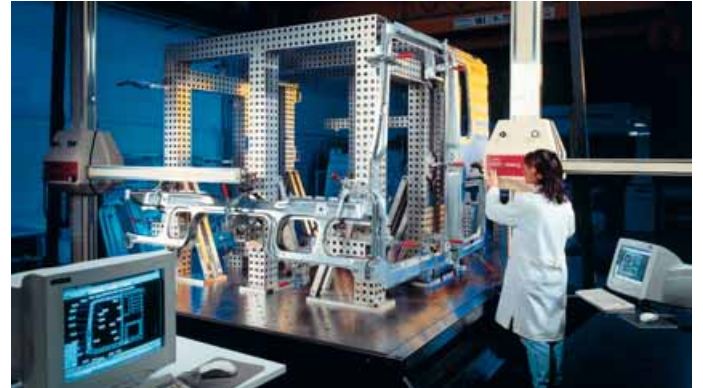
- reducing the number of total parts
- reducing the individual parts for each driver's cab variation
- maximising the number of common parts for all variations

raw materials and technologies such as steel, aluminium, plastics, hybrid, laser welding, clinching/pierce riveting, adhesive application in body-in-white and final assembly etc. were examined and evaluated for implementation. The results proved to be successful.

One of our major development aims was the increase of safety through structural measures.



The production of the body shell of the driver's cab was divided between the MAN plants in Munich and Steyr in a ratio of 3:2, where the body shell for each individual driver's cab is built with the delivered sub-assembly components. The components of the individual parts up to the complete sub-assembly groups are produced in the MAN plants in Gustavsburg and Steyr.



Karmann in Short

Wilhelm Karmann GmbH is a "Full Service Supplier" to the automotive industry, offering a wide range of services varying from complete vehicle engineering and tooling to niche vehicle assembly. Karmann concentrates on four business divisions - Vehicle Engineering, Tooling, Roof Systems and Production. With its unique portfolio of competences and capabilities, Karmann is able to find solutions which are completely tailored to the needs of the customer. Karmann currently employs approximately 9,200 people worldwide and has locations in Portugal, Brazil, Mexico and the U.S.A.

Business Units

The Vehicle Engineering division engineers complete vehicles, body-in-white modules and complete body shells and consists of design studio, concept team, FEM analysis, package/measurement/surface, design, plastics technology, powertrain and chassis integration, prototype construction and vehicle testing departments.

The Tooling division develops and manufactures prototypes and production tools for the body structure as well as for body shells (focus: complete body project); concepts, development, simulation and building of an entire range of equipment required for the joining of single stamped parts to a complete body shell as well as installation of aggregate units and convertible tops.

The Roof Systems division develops and produces convertible top systems including soft tops and retractable hard tops.

The Production division carries out series production of complete vehicles and modules and consists of stamping, body-in-white, paint shop and final assembly departments.



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