image: *Kampa Ex-Norm factory – by far the most automated factory visited during the mission*

AUFWIEDERSEHENBRICK?

Earlier this year, Paul Newman of TRADA Technology participated in a DTI-sponsored expert mission to study the German prefabricated housing industry. The mission participants represented a broad range of interests from across the social and private housebuilding sectors and visited manufacturers across masonry, concrete, aircrete and timber-frame sectors. Here, he reports on lessons learnt from the four timber-frame manufacturers visited and suggests a number of transferable lessons that the UK housing industry might consider to improve its quality, productivity and profitability.

A STARK CONTRAST

In 2002 almost 290,000 new homes were completed in Germany – the lowest figure since 1949. More than 85 per cent of these were for the private sector and approximately 40 per cent, and rising, are owner occupied. More than 23,000 of these homes were manufactured using timber-frame technology. A similar number of timber-frame homes were built in the UK.

The German housebuilding sector contrasts starkly with that in the UK. There is relatively little speculative housebuilding. Prospective purchasers order houses from a builder or, in the case of the prefabricated housing industry, the manufacturer, just like any other product. The land is sourced and purchased by the homeowner, who often also takes on the responsibility for statutory permissions, approvals and the costs of providing any infrastructure.

In this scenario, the design quality, aesthetics, functionality and durability of the house, as a product, are prime considerations for the purchaser and consequently, driven by market forces, for the housebuilder or manufacturer as well. They respond like other

manufacturers by developing, updating and customising their products. The manufacturers sell through a network of show villages, each of which displays around 75 houses. Clearly, such homes represent a considerable investment for the manufacturers and they are keen to extract maximum value from them.

This keen focus on sales and marketing is carried through to after-sales care. Purchasers are offered long-term maintenance contracts and membership of customer clubs in recognition of the fact that personal recommendations are an important driver for new sales.

ACHIEVING QUALITY

The average German timber-frame manufacturer directs a great deal of effort towards achieving quality – of design, manufacture, finish, fixtures and fittings and technical performance. forms of cladding are used, a ventilated cavity is often provided. Unlike in the UK, a significant amount of attention is paid to air-leakage and gaskets, whilst sealants are used to create sealed joints. This helps thermal performance significantly and would represent a significant improvement on current UK practice.

The acoustic performance of typical intermediate floors in Germany is likely to far exceed that of the UK. They often contain large volumes of solid timber and efforts are made to include isolation layers, additional mass in the form of plasterboard and a floating top surface. In many respects, the intermediate floors seen reflected constructions more commonly found as 'party' floors in the UK. Within-dwelling acoustic performance was further improved by the use of 'sealed' doorsets.

limitations and stick to them'. The customisation available includes a large range of rooflights, dormers, sunrooms, balconies and simple roof and room extensions. Interestingly, the amount of value added to the product by the manufacturer, both in the factory and on site, means that often they do not need to produce a huge number of houses to generate an acceptable income. Some of the manufacturers visited were relatively small family firms that produced between 200 and 400 houses each year.

The mission provided a stimulating opportunity to investigate and reflect on the structure and practices of a housing market quite different to our own. Nevertheless, there are many useful lessons to be learnt and, it is hoped, ideas and processes that can be transferred ■

modular construction of the post-industrial age is computer-customised, with designs varying to reflect the diversity of the different sectors, their needs and their preferences

image: *Cost-effective starter home with limited standardisation by Carl Platz*

The UK market is almost overwhelmingly dominated by factory manufactured, open-panel, platform-frame systems, where insulation, services, linings, windows, doors and cladding are site installed. In contrast, a typical German timber-frame manufacturer produces a post and beam/closed-panel hybrid system. The hybrid frame gives designers increased flexibility within a standardised system and the capability to produce closed panels facilitates the inclusion of insulation, services, linings, windows, doors and claddings in the factory. However, in many cases, the product leaving the factory is a straightforward frame with only linings, insulation and service conduits pre-installed. Even at this level, the product is more advanced than most frames manufactured in the UK.

THERMAL AND ACOUSTIC PERFORMANCE

Frontline technical issues for housebuilders in the UK include thermal and acoustic performance. Things are no different in Germany. Most manufacturers use similar width studs to the UK – 160mm versus 140mm – and the same insulation material. Thus, the basic U-values of the timber-frame component of the wall will be similar (U= 0.30 - 0.27). Many of the German manufacturers utilise insulated render systems on the outside of the frame and this reduces the U-Value to around 0.2. Where timber or other

ADDING VALUE

Without exception, the prefabricated housing manufacturers visited during the mission displayed obvious pride in all aspects of the quality and performance of their product and were keen to explain why their product was more innovative and represented better value for money than that of their competitors. The market structure dictates that the manufacturers need to add as much value as they can to the basic timber frame. This means that panels leaving the factory are always insulated and dry-lined and frequently come with services, windows and claddings pre-installed. All of the manufacturers were able to provide the customer with a full turn-key service, although self-build options were also often available.

The high level of value added in the factory did not translate directly into a high level of automation and there were cautionary notes from those with experience of large and expensive factories. Each manufacturer had selected equipment to suit their processes, products and ultimately customer requirements. The degree of customisation possible belied the level of design standardisation incorporated into the product and was proof that prefabricated housing manufacturers can achieve an acceptable balance.

The key seemed to be 'know your system and its

Lessons to be learned

- Design, technology and service innovations can be used to create and maintain differentiation;
- It is possible to achieve an acceptable balance between standardisation and customisation;
- The manufacturer can add value and improve quality by taking more work into the factory;
- Closed-panel timber-frame systems can be transported and erected undamaged;
- The UK must explore prefabricated lightweight claddings in more detail;
- Large, highly automated factories can work – but it's not easy;
- Partnerships can be used to create and maintain demand;
- It's not necessarily quicker if you do it in a factory.

The final report from the mission is available from: **www.asktrada.co.uk**