

Jürgen Gartung, Brunswick-Völkenrode

Trends in agricultural building

Impressions from a walk round EuroTier

Immediately after the "Expo" world exhibition, 1214 exhibitors took over the Hanover fairground for the international DLG special event EuroTier. The proportion of foreign exhibitors was very large at 43%. New and further developments for livestock production and management were presented in ten halls. Among the presentations were prefabricated housing, construction modules and architectural concepts. Information from advisory services, science and research was available in hall 23 covering current developments in agricultural architecture and presenting the latest results for discussion.

Under the motto: "Designing livestock accommodation for man and beast", a unit for 30 dairy cows in hall 24 was the centre of attention. The animals were milked by the "Lely-Astronaut" automatic system with a housing concept for future-oriented milk production. This comprised a cubicle house conceived as an outdoor climate unit. The building shell was represented by two gable plates and roof trusses. The support construction over the concrete foundations and flooring was steel frame. Roofing was corrugated fibre-reinforced concrete sheeting on timber frame. Taking the place of the outer wall between floor layer and eaves in the area of the cubicles was a roll-blind ventilation system. Reducing or closing the ventilation opening could be done from top-downwards or bottom-upwards. For regulating the so-called "curtains" an automatic control was used to determine the optimum degree of opening according to wind pressure or outer temperature (see LANDTECHNIK 1/2001, p. 57). Components and interior fittings were presented by various member firms of the organisation BFL, translating as Building Promotion in Agriculture.

The planning was carried out by the Chamber of Agriculture (LK) Building and Technology Department in Hanover. Additionally, the building advisory service of the LK Hanover was present during the exhibition to explain and answer visitors' questions. Here, the official advisers (LK) and those from the industry (BFL) complemented one another well. Also featured by the BFL was its topical products such as "Baubrief Landwirtschaft", a directory of goods and firms involved in agricultural building, and the revised version of the CD ROM on building and technology for farm indoor enterprises 2000.

A special event catered also for pig production. A range of housing and feeding systems for pregnant sows was presented by the DLG in hall 16. Here, visitors were able to see and compare loose-housed sow groups with transponder-controlled electronic feeding, trickle or mash nipple feeding systems, as well as feeding via self-catch crates with dry or liquid rations.

Prefabricated housing and production systems

A large number of visitors attended the stands of prefabricated building manufacturers every day of the event. They were interested in the tried and tested constructions as well as in new building materials and building systems. Wolf-Systembau showed its known timber-frame steel-frame or hybrid products and in its range now is an outer wall element of steel-reinforced concrete with core insulation. Also interesting was the partnership between Wolf-Systembau and Bruhne Planungs und Systembau GmbH which aims to increase production of prefabricated building components with fittings. However, the conventional approach to building with rural craftsmen involved when required is to remain in the services offered. A large selection of housing types were on offer at fixed prices.

Haas Fertigbau concentrated on buildings constructed economically to suit special systems. This means a large variety of designs were on offer. Alongside classic timber constructions with nail-plate-trusses or laminated timber, steel-frame buildings are also in the product range. For insulated building shells, the Haas-Thermowand or full-timber outer walls are available.

Timber buildings from Drott were offered for cattle, pigs, sheep and horses as well. Customers can choose between clear-span or supported roofs. Available cladding can be insulated or non-insulated. Rapid construction on-site is possible through prefabricated elements. New in the range is the window strip of plastic double steg plates which can be adjusted up or down through rope pulley and winch or actuator. With this system, the upper third of the building longitudinal side can be completely or partially open.

Designs for machinery buildings, which could be altered to offer open-fronted housing for calves and young animals, were exhibited by Conrads.

A new type of modular construction system for pigs was exhibited by the firm "modulfarm". Under-construction and walls are of prefabricated steel reinforced concrete elements. A basic model comprises floor-plate and two wall panels. On the contrary to

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the room cells utilised mainly abroad but also in Germany in individual cases for large domestic or office buildings, this building module is open at the top, thus 'U' shape. The prefabricated module is so proportioned (3•10 m) that it can be transported by low-loader from manufacturer to building site. There, the module can be placed directly on prepared foundation strips by auto-crane. The floor plate features 50 cm high slurry channel walls on the outside and in the middle in longitudinal direction. Through the room-height wall plates on adjacent sides of the flooring this gives two individual channels per element. Concrete slat elements or plastic grids are laid onto the 50 cm high channel walls according to the proposed use. The slurry removal pipes are part of the module system. These are joined together on-site after the modules are positioned. According to the individual design, the modules are lined-up either in a single or double row on-site. The length of the building is achieved through joining together the module breadths of 3 m. The building width with single-row construction is around 10 m, where two rows are made with 1.50 m central passage, the breadth is 21.50 m. Gable and compartmental partition walls, as well as ceiling elements in passage areas, are also made of steel reinforced concrete parts and are positioned crane. Roof and fitment parts are delivered with the module and mounted on-site.

The construction of the first house of this type in Schwäbisch Hall, May 2000 was demonstrated via photographs and video film. There, the object was a feeding pig house for 1200 animals with 15 modules in a double row giving a building 21.50 m wide and 45 m long. Through the positioning of interior walls, five compartments were established right and left of the supply passage. The positioning of the modules and fitting of prefabricated roof elements took place within two days in this case. Around two weeks were required for completion of interior work.

The 28 cm thick outer walls comprise two concrete shells with an inner layer of 12 cm thick rigid foam. Prefabricated roof trusses are timber, the ceiling sheet metal with coloured plastic coating. The constructional components for interior fitments and lining are delivered with each module. Electrical and sanitary installations should be carried out by local tradesmen. This means local personnel is then available for repairs and servicing if required. The module system enables a wide selection of housing sizes and ground plan variations and is suitable for piglet rearing, pig feeding and breeding. An existing facility can later be enlarged

through adding further modules. Technically possible is also the demontage of individual components and re-erection on another site.

Other manufacturers of sheds and turnkey housing continue to base their work on conventional building methods. Roof and wall support is mainly steel-frame. The outer walls consist of sandwich elements (Gillig and Keller, Hölscher and Leuschner). With Gillig and Keller, these comprise 60 mm thick rigid foam plates, covered on both sides with fibre-cement sheeting. The patented ventilation system combines four aspects simultaneously: exhaust air channelling, air induction channelling, heat exchanger and wall. The energy-saving air-air heat exchanger is integrated within a multi-shell wall. Contrary to the standard plastic sheeting used in conventional heat exchangers, the materials applied here – glassfibre reinforced concrete and stainless steel – promise longer life.



The firm Lambert Geerkens build with storey-high outer wall elements of concrete. The interior surfaces are smooth. Exteriors can be smooth or of roughcast concrete. According to the thickness of the insulation (4, 6 or 8 cm), wall width is 20, 22 or 24 cm. The roof cladding with low pitch roofing (< 12 degrees) is sheet metal. Steeper-pitch roofs are clad with corrugated fibre-reinforced cement sheets.

Cubicle housing dairy cows and followers where animals are not kept under a single roof but instead are housed in several smaller buildings could be seen by the visitor on the Zimmermann Stalltechnik stand. Such "system housing" can be attractive as completely new buildings or as additional housing extending an existing cubicle building. Individual cubicle rows have a single pitch roof on steel supports. Double rows of cubicles and the feeding fence each have a saddle roof. The passageways between the cubicle rows and the feeding passage are partly open to the sky. This form of housing recalls the cubicle stand constructions already in use 25 years ago with timber supports and developed for farm-labour construction (KTBL Worksheet Nr. 1070).

Following the Italian example of "Cuccteten" Hartmann Landtechnik presented a similar housing system, the Variostall 2000. Used as cubicle forms for the cows were concrete prefabricated components lain loosely alongside each other on a prepared layer of gravel, concrete plate or foundation. Cubicle dividers and roof supports of galvanised steel piping are subsequently attached to the concrete components. Roof cladding is sheet metal. The presented steel constructions allow a wide variations of groundplan design and housing systems. It was clearly demonstrated via video how such a building can be erected in a very short time. The building parts are simple screwed onto the concrete components, with the required attachment points being already-threaded inserts in the concrete.

The type of concrete lying form used in this case is foreseen for deep-bedded cubicle boxes. In new buildings, however, high cubicles are mainly built – these being covered with a soft and comfortable layer of material. An steadily increasing number of such covers are available. In addition to conventional rubber mats are now available cow mattresses, soft beds, foam plastic mats (EVA), waterbeds and stipple mattresses. Following the first group trials completed in 1998 (five DLG-commendations), there was held a second group trial which was completed shortly before the recent EuroTier. This resulted in DLG commendations for a further five cubicle floor coverings. Thus, ten products are now on the market which have been commended by the DLG as "Suitable as elastic floor covering in the lying area of high cubicles in appropriate housing." In that nine other coverings in the trial did not pass the durability test, all farmers can only be advised before purchase of such covers to get hold of a copy of the neutral DLG report and to inform themselves over the properties of the respective products.

Additionally, steel-reinforced concrete prefabricated parts for slurry channels, slatted flooring and for feed and slurry storage containers were on display from different companies. Cast iron, steel and plastic flooring grids, as well as plastic grids and slats of plastic for covering slurry canals and for pen floors were to be seen in great numbers. Also: components such as livestock housing windows, doors, roof cladding and insulation material as well as a comprehensive range of components for ventilation, heating and climate-control of livestock and storage buildings.