

Ludger Dederich, Bonn, and Ernst Witzel, Darmstadt

Exemplary timber buildings on the farm

Federal "Agricultural Building" competition 2005/06

From the beginning of history wood has been the dominating material for implements, outhouses and even whole buildings in agriculture. Its low weight and easy workability makes for a versatile material for which own labour can be used. And nowadays not only a variety of solid wood products are available for builders but also technically proven and competitive wood-based panels for a variety of applications. All this means that timber is not only a raw material which can be grown on many farms, but is also very suitable for farm building.

In 2005 the Ministry of Food, Agriculture and Consumer Protection (BMELV) introduced a federal rural building competition with the theme "Agricultural Building with Timber". Like competitions in previous years this aimed to honour exemplary building solutions able to serve as examples of extra good planning and encouraging farmers to partake in similar enterprises. To this end exemplary farm buildings mainly constructed with timber were sought. Skilled innovative application of timber or wood-based panels wasn't the only factor considered. Cost-efficiency and utility being important too, and the farms involved had also to meet the requirements of acceptable production conditions.

Strong interest in the theme was emphasised by 139 entries, mainly from the timber-rich southern German states. Building spectrum among the entries ran from barns for nearly all types of livestock through machinery sheds to roofed silage clamps and cladding for slurry silos.

After helpful preliminary selection at state level, 34 remaining entries of mainly good to very good constructions were laid before the federal examination commission. The specialists within the interdisciplinary commission selected eight of these and viewed them on location before finally recommending six for honouring by the BMELV. These covered two farms with outstanding constructional solutions plus a further four very good conceptions with minor weaknesses.

These six farms will be awarded certificates and cash prizes on November 14, 2006 at the TopTierTreff in Hanover by state secretary Dr. Paziorek for their exemplary conceptions. The farms will also be presented with a plaque for each winning building signifying the award and also aimed at stimulating discussion between visitors and the respective farmers.

The designs of the six winners are briefly described below. Further information on each farm is included in a KTBL publication available at the presentation.

Michael and Karl Dörr GbR, Karlshof

The Dörrs divided their new housing for 200 milking cows into two buildings with different roles: one with 2x3 rows of straw bedded cubicles and the other to house the milking area and a spacious rehabilitation station for sick and vulnerable cows. Above the milking area a seminar room for school classes and other visitor groups has been built from there visitors can look down through a window onto the milking carousel.

To allow other usage possibilities in the future, the builders decided on a self-supporting open design for the cubicle building with triangular laminated timber frames on steel supports. The inconspicuous roof support beams give the building a light appearance emphasised by the brightness of the roofing underside. The gable walls comprise large-area non-insulated frame construc-

Dipl.-Ing. (FH) Architect Ludger Dederich is director of the timber building advisory department, Timber Marketing Foundation, Godesberger Allee 142 – 148, 53175 Bonn

Dipl.-Ing. Ernst Witzel is a member of the scientific staff in the project sector "Agricultural Production, Rural Areas and Sustainability", KTBL, Bartningstr. 49, 64289 Darmstadt; e-mail: e.witzel@ktbl.de
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Fig. 1: The self-supporting construction with inconspicuous tensile beams gives a light and airy impression in this barn owned by the Dörr family.





Fig. 2: The Kűfner and Naiser partnership planned its cubicle house as a three-barn complex whereby timber cross sections worked out relatively small.



Fig. 3: Family Dennemann harvested three different types of timber from their own woodlands and applied them according to their specific qualities in the building of a goat barn.

tions with 5 cm thick solid timber cladding. Protective wood staining was applied to the façade whereby this was less for longevity and more to prevent discolouration and loss of the warm appearance of the timber.

While the wall construction of the rehabilitation area was the same as the cubicle house, selected for the roof was a simple steel cable supported truss construction of laminated timber.

Practical application of engineering possibilities plus industrialised – almost standardised – timber building solutions combined with elements using other materials have all been applied to achieve cost-effectiveness in the whole concept. Intensive planning towards optimising the procedure was given more importance than the use of own labour in the construction.

Biohof Kűfner/Naiser GbR

Organic milk production is the enterprise in this farming partnership which first saw the creation of a 3-building cubicle complex for 160 cows and 40 in-calf heifers. Timber was selected for building material because of experience the builders had gathered with this medium in an older building erected in the 1970s.

The cubicles in the new building offer more space per cow than required by EU directive 2092/91. This adds to the airy and spacious impression that the interior gives and is further strengthened by the side curtains which can be opened from above and below at the eaves and in the spaces between the different buildings. Trapped air under the roof is also avoided through the open roof ridge design and the lamellae integrated in the cladding over the gable-end doors.

The total project presents itself as an engineer-standard timber building with clear

lines and practical design, an impression added to by relatively small timber cross sections and a high degree of prefabrication. Especially noted were the proportions of the constructive timber cladding achieved through sufficient base height and covering of purlin heads.

Helping the overall coherence are the successful proportions achieved and especially the façade cladding. Untreated larch was used for weatherboarding on the walls as well as the cladding of the sliding and sectional doors. The parlour area outer walls were of 30 cm thick wood-frame panels with interspace insulation.

Dennemann GbR

The Denneman family farm saw little long-term future with milk cows and decided to expand its already existing goat enterprise. In a compact bedded barn for 142 goats the passages and lying areas are placed around the yoked feeding passage. The raised passages on the eave sides serve as substitutes for climbing frames for the animals and can also be gated-off and used as visitor access.

With the exception of the cement block milking area the barn is timber built with own-grown conifer and deciduous timber harvested and sawn on location with a mobile sawmill. The specific timber properties decided where the wood was to be applied. Because of its strength, oak was chosen for the supports of the truss roof. For the roof timbers, conifer was used and, for gable cladding, traditional poplar. In addition wood-based panels were applied as strengthening ties for the framework intersections and corners. Overall, from the background of an unusually short planning and construction period there emerged a balanced, compact and airy livestock building.

Johann Kinzner, Schergenham

As part of the complete renovation of his farm buildings Johann Kinzner demolished his old steading to establish firstly a machinery barn with workshop. The architect involved selected for this a quasi massive timber construction unusual not only for farm buildings. This was of large-format 4 cm thick three-ply panels with frame ribs of laminated wood. Prefabrication of these produced 4 m wide, wall-high elements for the outer wall and roof plates to be mounted on-site. Panel elements were friction-locked with the load-bearing supports to guarantee stability – a design in which the massive wooden panels take over three functions: space dividers, weather protection and for stiffening the construction.

The handwork perfection of the interior sets-off the blade-levelled concrete flooring which has a surface of cast plaster quality. The 15 x 40 m building free of central supports covered by a truss roof of solid timber cross sections with inside ties features a wide through-pass down the middle and two further doors on one long side for multifunctionality. A belt of translucent roofing material allows daylight to flood the building giving it the characteristics of an atelier. Biogas producer Kinzner produces enough supplementary heat for the entire building to be underfloor heated at very little extra expense.

Apart from a few planning mistakes and construction slips this farm has created from conventional timber construction and wood-based panels and a large amount of prefabrication an architecturally successful building with innovative construction and high quality completion, especially in the interior.



Fig. 4: Three-ply panels with laminated timber frame ribbing are basic elements brought together in the construction of Johann Kinzner's machinery barn.

Alois Schmid GbR, Grasleiten

The Schmid family run a suckler herd and fatten cattle within an organic system. The new naturally-ventilated housing for 58 suckler cows and 54 beef cattle was planned as a three-barn complex in truss construction with limited span and timber cross sections involving as much joinery work as possible. The long elevation of the beef barn was built on a reinforced concrete socket and back filled with foundation diggings to help level out the building site. Timber cut from own woodland and matured for a year was used.

Most was used unplanned but milled round poles were used in the livestock area.

The building complex has been erected in the vicinity of the protected buildings comprising the Hofstelle Ensemble. But the design is such that the farm steading retains a respectful distance through its unimposing mass contributed to by the choice of several buildings instead of a single big one. Additionally, the formal appearance of the new buildings doesn't attempt to fit in with the already existing historical facades but instead makes its own confident statement - also because of its comprehensively skilled construction - as an object of its own time.



Fig. 5: For beef cattle the Schmid family built straw yards and for dairy cows cubicle housing on both sides of a roofed feeding passage.

Reiterhof Staud, Ziegelhof

The Staud family erected its new horse stable with 40 boxes on an awkwardly-shaped site whereby both stable passages opened onto a central area. Facing this are the saddle rooms, the office, the machinery room and the sanitary offices. And from here the neighbouring riding hall is also just a short distance away.

Conventional but still clearly-lined joinery construction appeared best for this building with outer wall construction pierced by framework corners whereby the positions of the supports are determined by the layout of



Fig. 6: Special front walls with feeding slits and removable horsebox side walls bring considerable labour savings in the stable built by the Staud family.

the horseboxes. Because of the removable partition walls, double supports were selected which are not required for the load-bearing frame. However, it's also clear that the coherence of the total complex has not been consistently kept to in the details. In this respect higher quality could have been achieved with more effort in the planning phase.

On the other hand the extension details such as the partitions between boxes are among the details especially imaginatively developed by the builders. Thus the box front walls have special feeding slits so that the animals can feed directly from the box passage. Further, the mirrored juxtaposition of the boxes mean that four boxes can be supplied from a single position. And for mucking out the boxes with tractor and loader the side walls of the boxes can be pulled out into the passageway.