OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

08785

Distr.
LIMITED

ID/WG.296/5
12 April 1979

ENGLISH

United Nations Industrial Development Organization

Seminar on Wood Processing Industries

Cologne and Hannover, FRG, 16 - 30 May 1979

FITTINGS AND HARDWARE FOR FURNITURE AND JOINERY PRODUCTS FOR MECHANIZED SETTING *

by

Desmond P. Cody **

* The views expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

** UNIDO Consultant, presently with VRBAS, Radna Organizacija Drvne Industrije, Banja Luka, Yugoslavia

id.79-4336

CONTENTS

Introduction

INTERZUM trade fair, Cologne, is regarded as the major exhibition of materials and accessories used by the furniture, joinery and general wood working industries. It is held every two years immediately before LIGNA, Hannover, the other big wood working machinery fair and thus enables attendance at both where the latest trends and developments in materials and processing may be studied and acted upon. INTERZUM was first held in the early nineteen-sixties and each subsequent fair has shown a marked increase not only in the range and diversity of products and equipment on show, but also in the number of participating countries, which, in 1977, numbered 31 including over 700 exhibitors.

There have been many major changes in the wood and wood based industries especially in the past twenty years. Up to then it was regarded as craft based, where the emphasis was on the exercise of largely manual skills and the processing of natural raw materials. Gradually the craft base gave way as the need for vastly increased output grew and with it came the introduction of high speed processing machinery and new materials such as adhesives, synthetic lacquers and particle board, to name but a few. Today the transition to a science/engineering base is complete and even though industries such as furniture and joinery remain firmly rooted in their illustrious traditions they have, nevertheless, adjusted to these great technological changes which have benefitted both producer and consumer alike.

Nowhere are these changes more evident than in a trade fair such as INTERZUM. It is truly the shop window for all those industries which serve the wood industries and this can best be appreciated by its broadly based range of goods which include raw materials, finished and semi-finished products, production supplies, fittings and locks, machinery and equipment, hand tools, materials for interior decoration and technical and managerial trade publications. Most of these relate either directly or individually to the two major secondary wood processing industries, namely furniture and joinery and emphasise their increasing dependence on materials and components coming from a variety of sources.

1. Trends in the hardware utilization

The purpose of this paper is to examine the trends which have taken place especially in fittings and hardware and to study their application in furniture and joinery production especially for batch and series production. At the outset it must be emphasised that the use of modern fittings, and particuarly those which are used for structural purposes in the place of conventional joints, does not represent any departure from accepted standards of quality or specification. On the contrary, if anything, even higher standards of workmanship are necessary and extremely close tolerances must be achieved. It is therefore appropriate at this stage to enumerate the essential conditions for their successful application especially for knock down (K.D.) and self-assembly (S.A.) furniture:

- the plant should be at least fully mechanized or partly automated;
- a machining tolerance of ± 1/10 mm should be maintained;
- calipers and gauges, not measuring tapes, should be used for checking components;
- highly trained technicians should set up and maintain all machines;
- worn profiles and cutters should be replaced immediately;
- standardized components should be used throughout production;
- inspection and quality control should be completely effective;
- only good quality high density particle board and other materials should be used;
- solid wood components should be kiln dried and should have a moisture content of not more than 10 per cent;
- all machining, assembly and location jigs should be made from hard wearing materials and should be carefully maintained;
- only high quality performance tested fittings should be used;
- the fittings chosen should enable simple, troublefree and easy assembly;
- they should be capable of being adjusted in use;
- the components should be packaged so that they are impervious to damage;
- assembly instructions should be well illustrated and easy to follow.

It may therefore be concluded with complete justification that fittings such as those referred to may no longer be regarded as purely decorative or

as serving a relatively minor function. Many, such as handles, knobs and profiles can and often do add very much to the appearance of the product, but in general, fittings may be said to be now an integral part of any design programme providing not only an aesthetic effect but also performing, in many instances, an essential function. This is particularly the case for locks, hinges, stays and supports, and, as we have seen, for furniture incorporating K.D. and S.A. types of construction. The furniture designer therefore will play an important role in the selection and use of fittings for specific ranges, and will be influenced in his choice not only by appearance but also by function, performance, the need for standardized parts, ease of assembly and disassembly.

The manufacturer should carry stocks of fittings equivalent to at least three months normal consumption and in the case of enterprises in developing countries this should be increased to six months in order to ensure adequate availability for production and to guard against fluctuation in supply and delivery. Naturally this adds to operating costs and emphasises still more the need to exercise care and thoughtful planning at the selection stage. Regrettably there are today many factory stores in many parts of the world which are partly filled with virtually useless but expensive fittings which need not have been so had there been more careful and informed research before the decision was made to buy. Fortunately most fittings manufacturers make available excellent technical literature which describes in detail the technical make up and use of their products. They will also, on request, provide working samples so that the furniture or joinery manufacturer and his designer have ample technical information on which to make a good commercial decision.

2. Fittings and hardware for furniture.

2.1 Kitchens

Modern kitchen furniture is relatively simple to produce, being made up mainly from melamine-faced and plastic-laminated particle board, incorporating various types of storage facilities as well as providing for electrical kitchen equipment such as cookers, washing machines, etc. Styling is achieved by a wide variety of colour combinations and the use of an extensive array of interior fittings and accessories. Parts and elements are fully standardized and in 1979 practically 50 per cent of all kitchens produced will use some form

of K.D. or S.A. for assembly purposes. Not all units will be delivered in "flat pack" form which underlines the extent to which this form of construction has replaced the more traditional ones. A recent trend is the replacement of plastic laminated door and drawer fronts by solid wood and veneered members while the rest of each unit remains essentially the same.

Handles for floor and wall units and drawers are, in the case of solid wood elements, moulded into the element or, alternatively, in the case of plastic faced material, planted on using an anodised strip of metal or plastic. Hinges are the standard recessed type which are spring-loaded thus eliminating the need for closing catches, and they enable adjustment of the door after it has been hung. There is a wide variety of shelf supports in either metal or plastic, the latter being supplied in cartridge form for fixing with a pneumatic gun. All catches are magnetic and doors for some wall units are of the "up and over" type to enable easier access where there is a problem of height. Drawer interiors are either of extruded plastic or profiled melamine-covered particle board and slide easily on pre-formed and bored drawer slides. There is a special "carousel" fitting available for floor units which abut at corners enabling access to what would otherwise be lost space by means of circular shelving systems operated either manually or pneumatically. Finally all units have special floor levelling devices to ensure perfect alignment of the entire kitchen.

2.2 Bedrooms

From a construction point of view, the production of modern bedroom furniture does not differ all that much from kitchen units. The same core materials for carcases and doors are used and external surfaces may be finished using natural wood veneers or wood-imitation p.v.c. foils and laminates as well as plain colours. The similarity also extends to fittings used in both, so it is therefore not surprising that many kitchen producers also manufacture bedrooms and this trend is growing every year. Both can be produced on the same panel lines and there is the need to supply large wardrobes and other similar storage units in a form which can negotiate hallways and narrow staircases leading to apartments in high-rise buildings.

Bedroom furniture provides the designer with greater scope to produce a variety of styles and a higher degree of individuality in his designs. This is helped by the "free standing" nature of the product even though wardrobes in many instances are an integral part of the building. At all events, fittings play a major role in the construction, function and appearance of bedroom furniture and there is an abundant variety from which to choose. For structural purposes, the fitting which is still very popular is the cam lock used in conjunction with a dowel. As the cam lock is turned, it tightens the connecting parts and, at the same time, pulls the dowels closer together for a more secure fit. If the wood should shrink, or the joint for some reason should loosen, the cam lock can be turned to tighten the components again. There are many variations of this type of fastening but most have the disadvantage of having to be fixed to the surfaces of the components being jointed whereas the cam joint is fully recessed, and therefore completely hidden from view. Another fitting worthy of note is the espagnolette lock which is used mainly for wardrobe doors. This has a central locking mechanism operated by a key as with a conventional wardrobe lock. Attached to this mechanism are two metal rods which run the full length of the inner side of the door from top to bottom. At each end are hooks which grip spigots fixed to the top and bottom of the wardrobe when the lock mechanism is activated. This not only secures the wardrobe doors, but also ensures that they remain in complete alignment. Other fittings include those for shelving, drawers, clothes hanging, shoe storage, mirror fitments and lighting.

2.3 Living rooms

This sector of the industry is dominated, at least in Europe, by the wall unit, a highly rationalized combination of cupboards, open shelving and drawer storage which serves a multi-purpose function in relation to living-room usage. The product is particularly suited to modern living conditions especially in apartment buildings where space is often at a premium and there is the need to make the best possible use of it. In consequence it represents a very high proportion of the industry's output and its development has received a lot of attention from designers and engineers. Fittings

manufacturers, seeing its potential marketability have naturally followed suit and thus its penetration has reached almost saturation point.

Again it may be concluded because of the basic similarity of raw materials between it and kitchens and bedrooms, that the same structural and functional fittings may be used by all three. In addition, however, wall units incorporate provision for open shelving, glass-fronted cupboards for storage and display, television and record players, and there is a wide variety of fittings available to suit each purpose. There are, for example, special hinges and locks designed specifically for use with plate glass doors, special hinges, stays and locks for "pull down" writing panels and an adjustable shelf mechanism for television cabinets. All wall units are constructed with S.A. fittings and shipped in a pack flat condition.

2.4 Chairs and upholstery

Even the dining room chair has not escaped the attention of the fittings manufacturer despite its traditionally basic design and need for high performance and strength ratio. The advantages of being able to ship in unassembled or partly-assembled form are obvious and these and other considerations encouraged the fittings designers to investigate the possibilities for K.D. fittings to be adapted for use in chair construction. That their efforts have been highly successful is best appreciated by the many chair and seating manufacturers who now use these techniques as a matter of course. Probably the most revolutionary of these and certainly one which had the most far reaching effects is the metal connector for chair legs to rail construction. This consists of a brass dowel bushing, threaded internally and externally which is inserted into the end grain of a chair rail alongside a locating dowel. It cannot be dislodged because it is fixed through a wood dowel driven into the rail at right angles to the bushing. A hole is bored through the leg opposite to where the bushing will connect and leg and rail are fixed together by inserting a bolt with an allen head through the hole into the bushing and tightening with an allen key. This joint has been subjected to the most severe performance tests with little resultant failure, but the same strictures concerning standardization and accurate machining apply here also.

Upholsting also lends itself to K.D. techniques especially the partially upholstered or show-wood type frame which is ideally suited to the construction described in the previous paragraph. Even fully upholstered settees and armchairs are now produced in sectionalized form and need not be finally assembled until they reach the consumer.

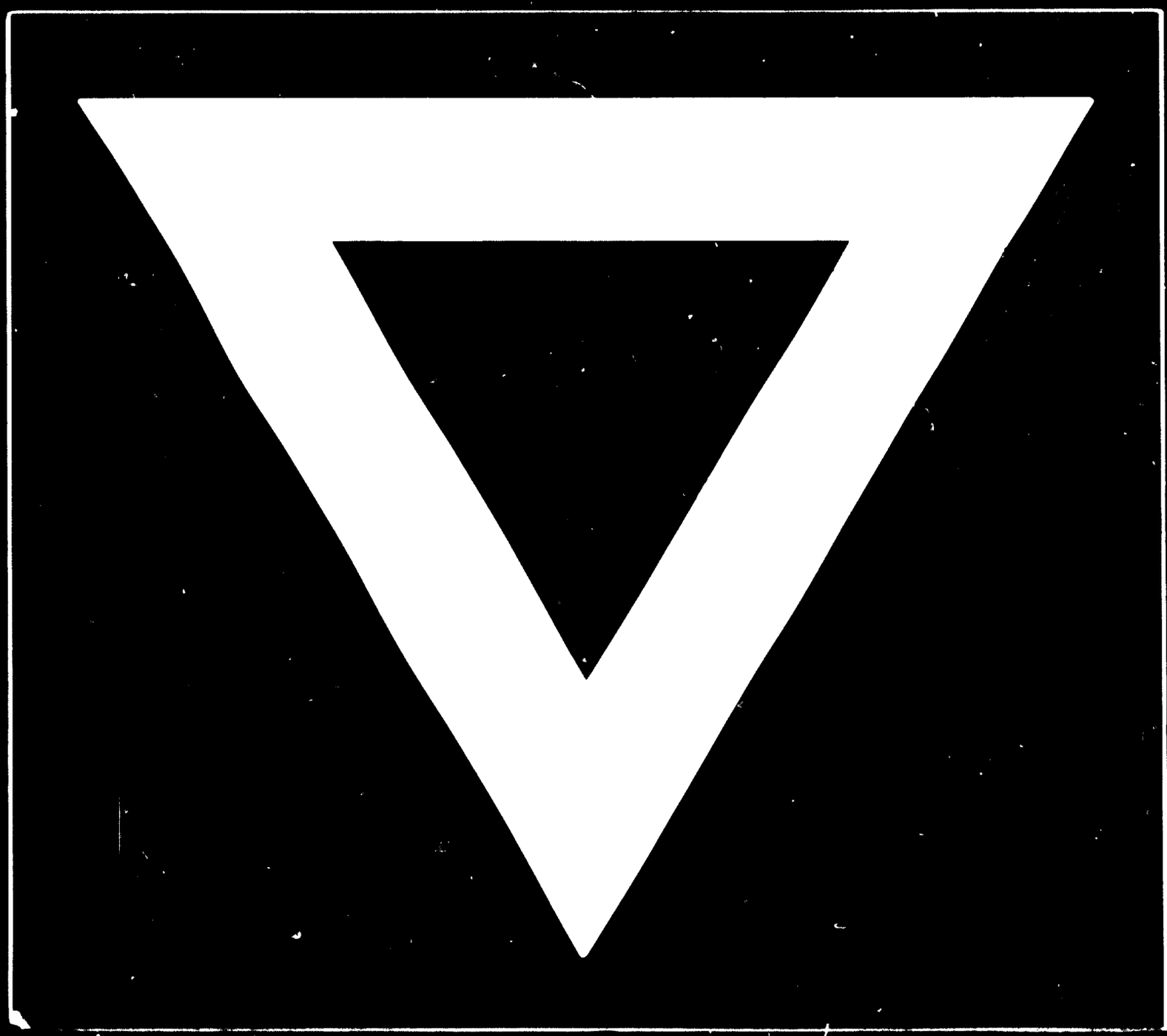
3. Fittings and hardware for joinery products

Doors and windows

Fittings for joinery, which are known in the trade as "furniture" are functional and decorative rather than constructional. They therefore include for internal joinery such as flush and framed doors, hinges, mortice locks, plain and decorative handles, door lifting and closing equipment and the various fittings associated with partitioning such as joint connectors, floor levellers, and many of those used for wall units, where the partitioning system incorporates shelving, drawer and storage facilities. External joinery fittings particularly for windows is varied and extensive, simple and complex. They are designed to suit a variety of frames and choice is dependent upon function, price and the preferences of particular markets.

Many suppliers also provide special machines and equipment such as hinge recessors and locators to facilitate the fixing of their products and to ensure complete accuracy.

B-81



80.02.04