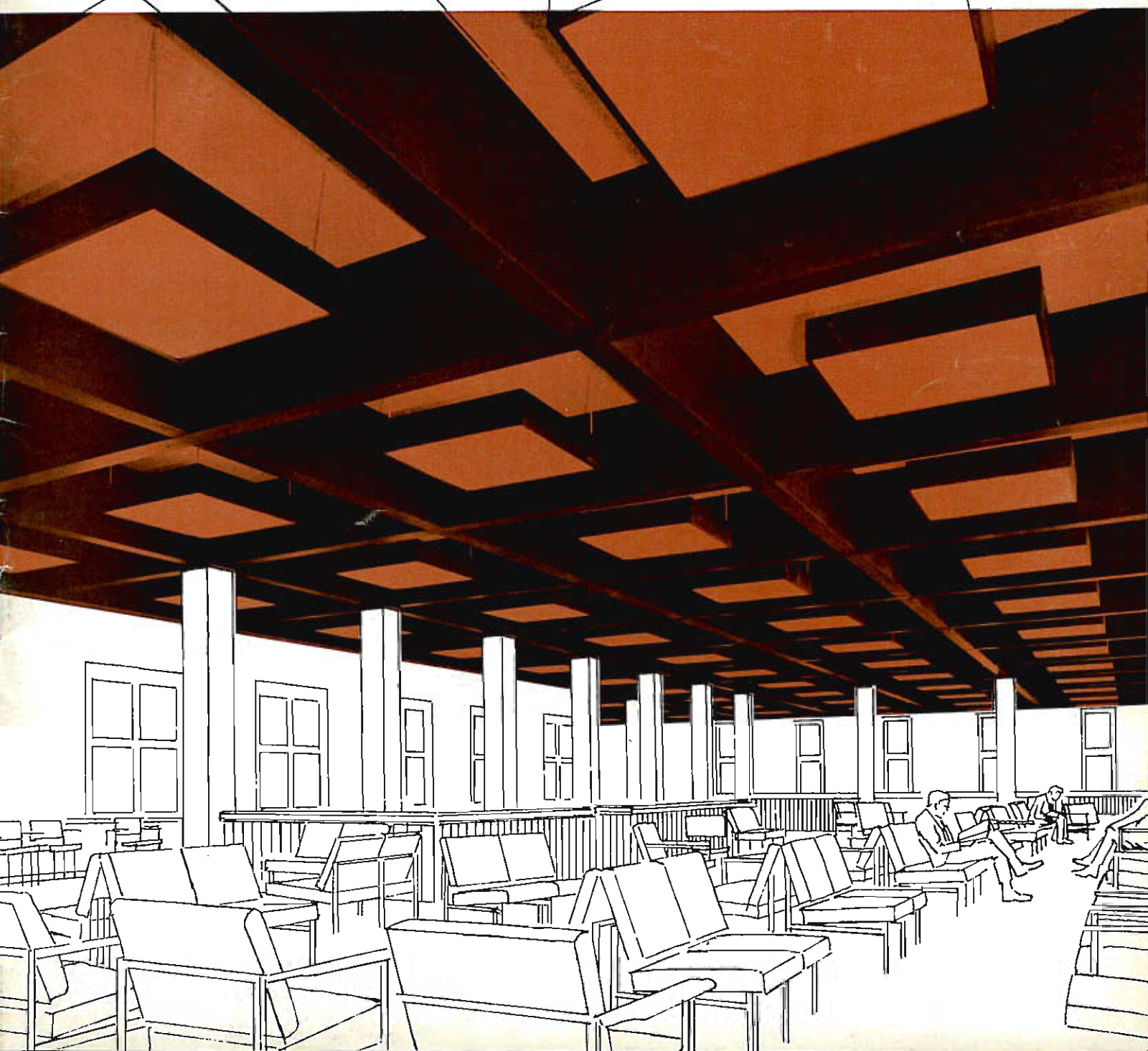
FOURTH QUARTER 1967/VOLUME 9. No. 4

plywood

AND PLYWOOD PRODUCTS



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plywood AND PLYWOOD PRODUCTS

COVER: Plywood box beam roof system at La Trobe University — one of many dramatic structural applicatiens of plywood in 1967.

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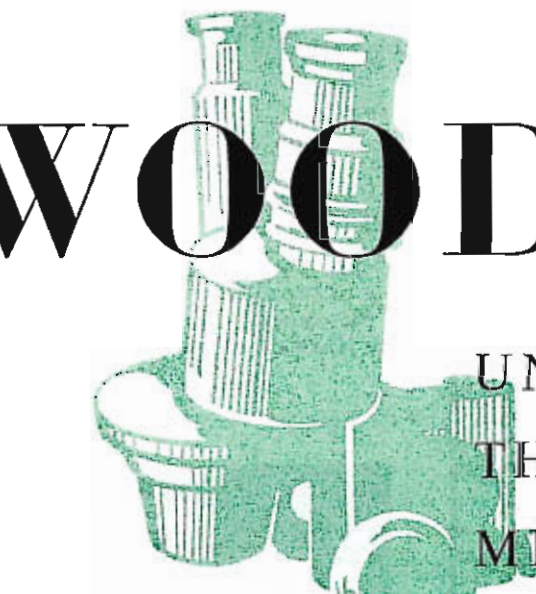
PLYWOOD UNDER THE MICROSCOPE



VENEERED PANELS as a type of plywood have been made since the days of the Pharaohs. Examples of sliced veneer construction obtained from ancient tombs remain in amazingly good order. Plywood, however, did not come fully into its own until the relatively recent advent of cross-laminated constructions, rotary cut veneers and waterproof glues.

Down through the ages the semi-precious character of many exotic woods often inhibited their use as thick boards. For this reason, the craftsman's art of slicing costly woods into thin veneer for making fine furniture grew up, particularly in the middle ages.

Beautiful sliced wood veneers were valued then, and still are, but plywood for commercial and utility applications was not appreciated until late in the nineteenth century. Gluing of alternate veneers at right angles to each other for strength purposes, along with rotary peeling of veneers by the lathe, brought plywood into the modern age.

Away from the 3-Ply Image

The new method of plywood manufacture, because of strength, light weight and low cost, provided mass produced material for furniture and tea-chests. Technological requirements of the aeroplane in World War I led to an advance in design understanding of the strength properties of thinner light-weight plywoods. The development of economic waterproof gluelines for commercial hot press manufacture less than forty years ago, finally forced plywood from the restrictions of

furniture manufacture and the three-ply tea-chest image. With the outbreak of World War II, synthetic resin-bonded plywoods in the air, at sea and on land, opened the world's eyes to the enormous possibilities for the material as an engineered building board.

Sophisticated designers today could be suspicious that the Pharoahs were just lucky and that plywood history is just bunkum. Written specifications, quality control, known properties and continuous testing and development are the criteria of any modern material. These are the principles of present Australian plywood production.

Waterproof Glueline Developed

In 1912, Dr. Leo H. Baekeland discovered that a mixture of chemical compounds, plus alkali, plus controlled heat, equalled a miraculous new material, a synthetic resin. This new resin could be moulded into shapes and forms, such as telephones, and proved to be permanently impervious to water and wet conditions. In the 1930's the wonderous new resin was adapted to plywood manufacture as an adhesive with properties unmatched by earlier animal and vegetable glues. The chemicals were phenol and formaldehyde and the alkali material acts as a catalyst to cause extraordinary chemical changes when heated. The molecules in the phenol and the formaldehyde combine to form a new chemical compound: Phenol - formaldehyde.

During the initial stages of the reaction ("A" stage) the molecules of the newly formed resin compound can be dissolved in water. As more heat is added the molecules begin to combine with each other to

LA TROBE UNIVERSITY

STAGE ONE

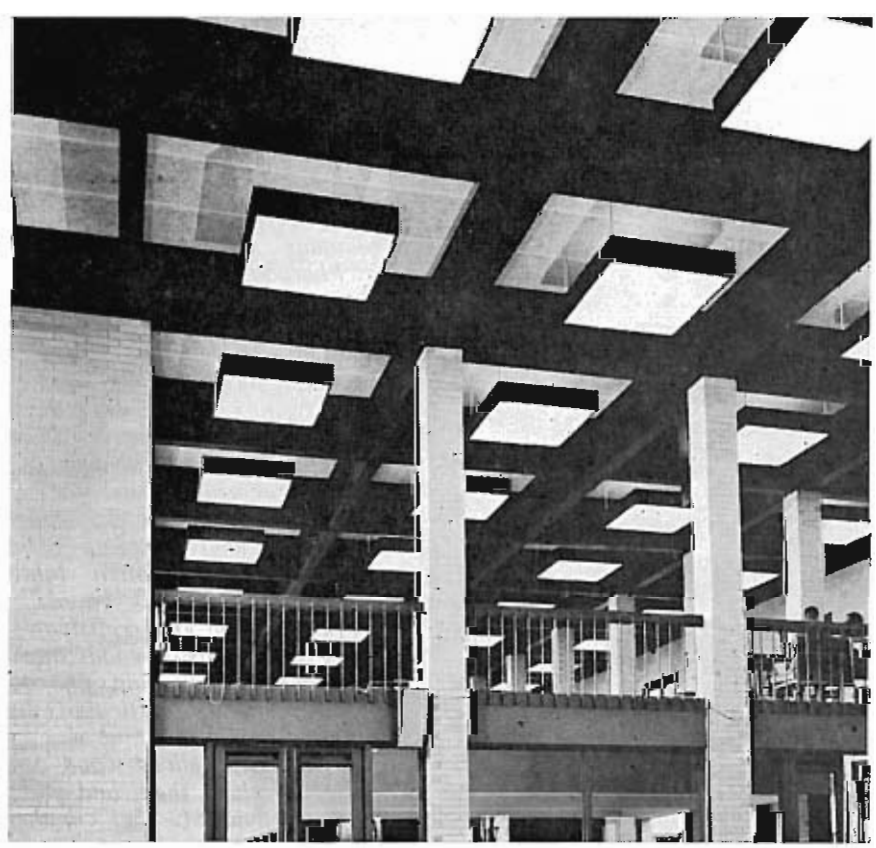
ON A 500-acre site north of Melbourne, La Trobe University is being developed. Designed to suit the general typography, the complex of buildings and facilities that is La Trobe provides Victoria with its third university.

The architectural features incorporate ideas gathered during a world tour early in 1965 by the master planner Mr. Roy Simpson of Yuncken Freeman Architects, Melbourne.

Stage One is complete and consists of broad site works, a portion of the central library, the first college (Glenn College), the Union or Main building which contains central student facilities together with some teaching facilities, male and female residences and a master's residence.

The Colleges are to be a vital part of the plan to give students a corporate sense. Every student, whether in residence or not, will be a member of a college. The Union buildings will provide academic, dining, cultural and recreational facilities. Study bedroom

Below: The plywood box beam roof system in the La Trobe University, Union Building.



Above: The Union Building at La Trobe University. Cedar windows were protected during construction by plywood panels. Concrete formwork was plastic faced plywood.

accommodation will be in separate wings for men and women but they will share the other common amenities.

Glenn College

The first college has been planned by Hassell McConnell and Partners. It is a rambling 2 and 3 storey design and trees have been preserved to create an informal atmosphere.

All buildings are developed on a modular basis from bricks of 4 in. to a modular development of 2 ft. 8 in. to an overall grid of 10 ft. 8 in.

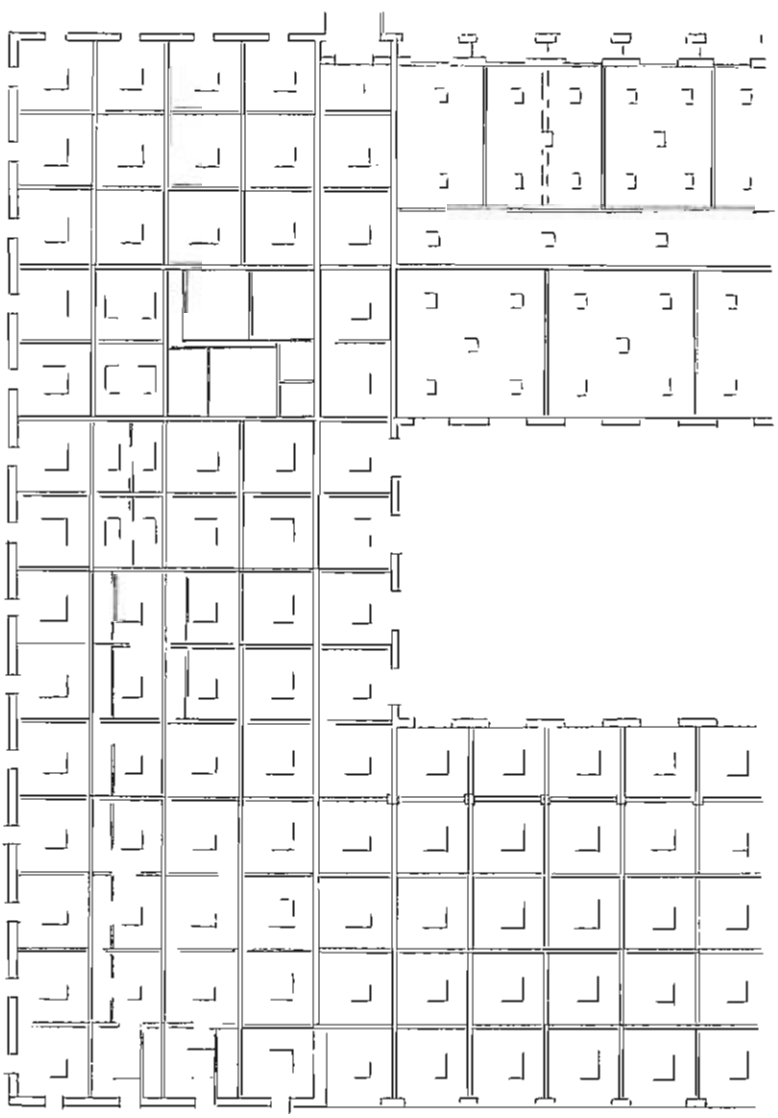
With grey modular clay brick and grey glass exterior, the required atmosphere is maintained internally by open space and the use of natural materials.

Brickwork is exposed; concrete is off-the-form; timber and plywood components are natural stained.

The Union Building

This two-storey building contains dining rooms, lounge rooms, recreational rooms and other student amenities together with tutorial rooms, seminar rooms, lecture rooms, a lecture theatre and student study areas. There is an

Below: A section of the reflected first floor ceiling plan in the first residential college illustrates the plywood box beam egg-crate pattern.



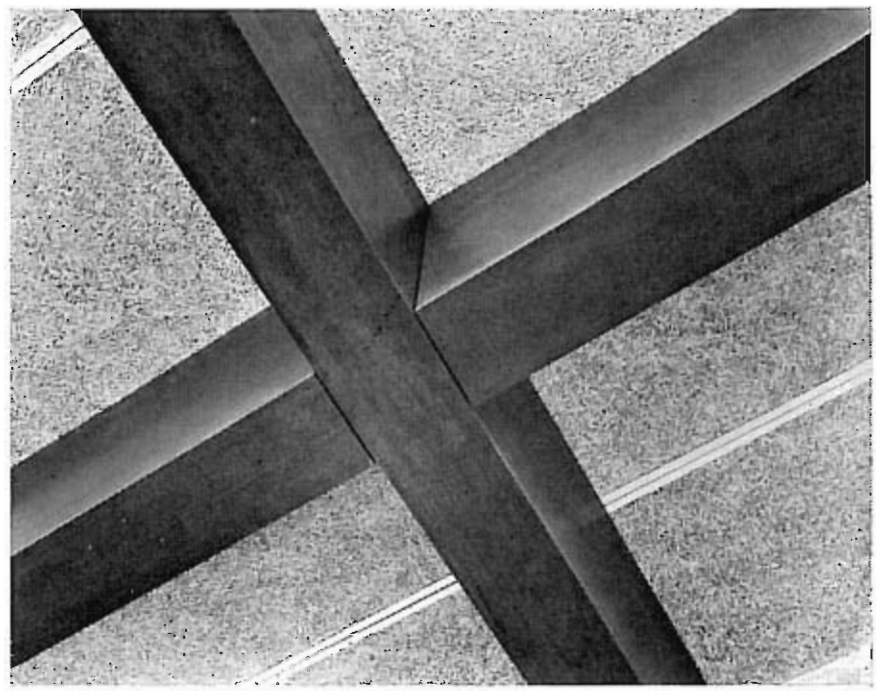
form still larger molecules ("B" stage). The compound is no longer affected by water, but it can still be dissolved by alcohol. As more heat is added, the final "C" stage is reached. The molecules are now fully combined, the material has polymerised. The glueline has become inert and no exposure to water, extreme heat or freezing cold will weaken interlocking links. Under scientifically controlled heat and pressure the phenolic resins of the high temperature group are used in film and/or liquid form in the manufacture of waterproof glued plywood.

Only phenolic resins are used to permanently bond in the hot press the exterior, structural and marine plywoods manufactured as P.A.A. plywood by the Australian plywood industry.

Gluelines Most Critical

All plywoods, interior or exterior, have enviable properties. Veneers can be selected and accurately dried to any desired moisture content which increases their individual strength. The act of cross-laminating veneers contains the natural wood movement effecting an extremely stable material and providing tensile strength in two planes. But it is the glueline which is most critical.

For exterior, structural and marine constructions, a designer must be assured that the plywood has a permanent phenolic resin bond and that the material has been produced to exact specifications. Quality marks, therefore, have been introduced by the Plywood Association of Australia to identify products with known and tested properties. The use of the P.A.A. quality control stamp is dependent upon the manufacturer's participation in a strict quality



A close-up view of the meeting of three plywood beams. Secondary beams are fixed between main beems as lateral stiffening.

internal courtyard and traditional cloister.

Roof construction is an egg crate pattern of plywood box beams 2 ft. 8 in. deep x 8 in. wide at 10 ft. 8 in. centres both ways, supported on 16 in. square brick piers. All beams are of $\frac{1}{2}$ in. waterproof glued, structural plywood and are cambered. The beams are used over an area of approximately 2,825 square feet. "Woodtex" is used as decking between the Australian plywood box beams.

Large timber light fittings are suspended between beams to complete the three dimensional ceiling pattern in the upper floor.

Main box beams span up to 42 ft. and short beams pocketed into main beams as lateral stiffening are 10 ft. 8 in., spanning 10 feet.

Where this pattern is concealed by a false ceiling single web structural plywood "I" beams are used.

The 3 in. Woodtex decking between the beams preserves the natural character and texture as well as providing acoustic and thermal insulation.

Roofing is of 20 gauge aluminium decking and the roof form is a traditional Mansard pattern.

The University complex is well planned. Stage Two is now under construction and includes a Science building and a second college (Menzies College).

La Trobe University received its first students in March, 1967.

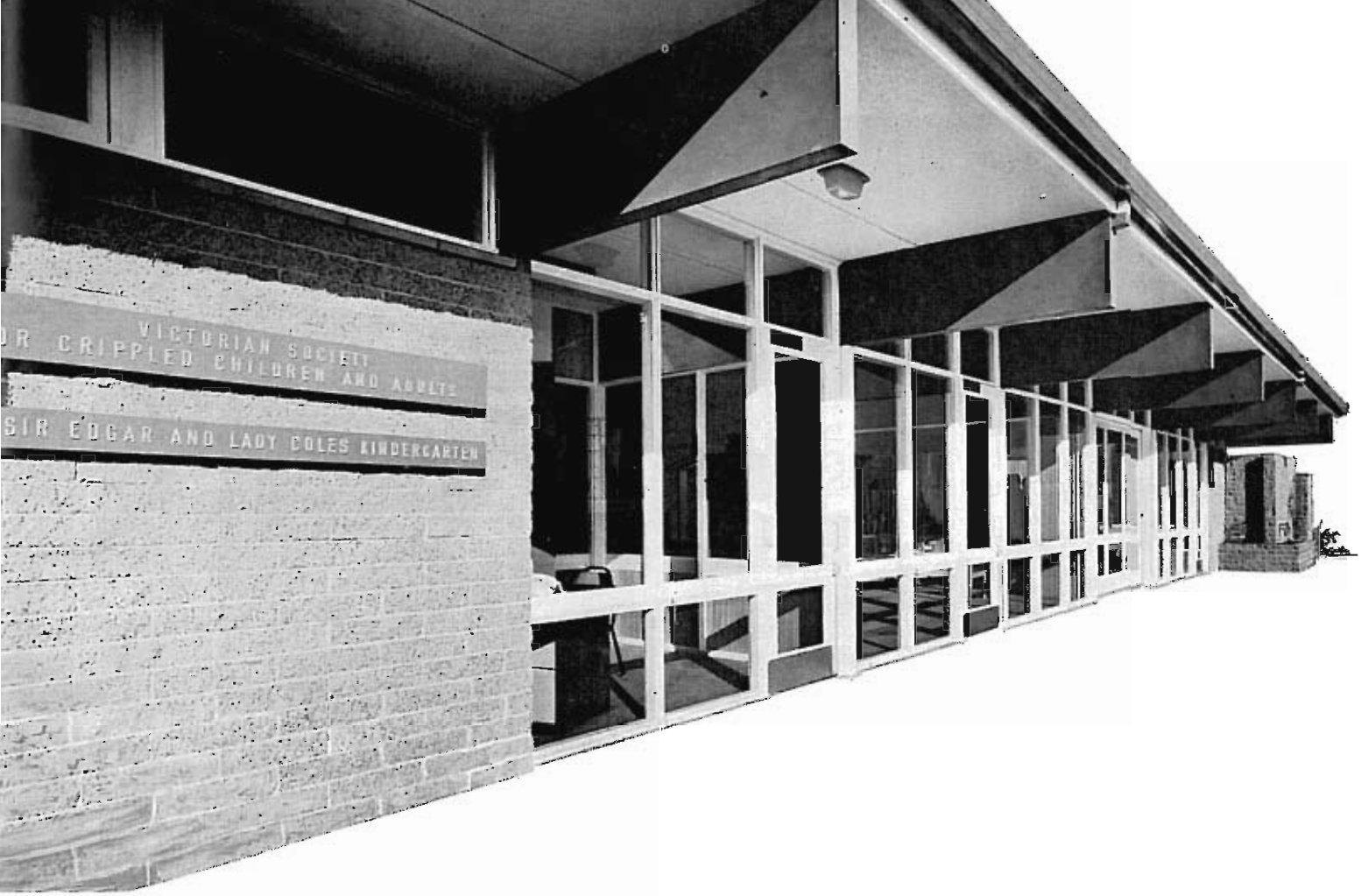
Supervising Architects: Yuncken Freeman, Melbourne.

Glenn College, Union Building

Architects: Hassell McConnell & Partners, Melbourne.

Engineers: Kinnaird Hill, de Rohan & Young, Melbourne.

Builders: L. U. Simon Pty. Ltd., Melbourne. ■



HELPING THE HANDICAPPED

THE Victorian Society for Crippled Children and Adults has been operating pre-school centres in Melbourne for handicapped children for several years but, in all instances, these have been held in converted church halls or other properties which were not designed specifically for this purpose. Consequently it was difficult to operate the centre efficiently. Arising from these difficulties, the Society decided to build a new pre-school centre constructed specifically for the needs of handicapped children. The land was made available on long lease by the Nunawading Council.

In planning this Centre, it was decided that it would be used as a Teaching Centre so that student teachers and members of medical professions can study the children during their lessons and at play without being observed and so learn something of the problems with which the children are faced. In addition, it was decided that the Centre should be planned for entertainment and instructions at night, thus becoming a social centre for the handicapped people of Melbourne's Eastern Suburbs.

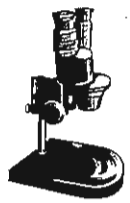
It was necessary to consider the environment of the building as well as the building itself, so that both indoor and outdoor play may be integrated and provide every opportunity for children to develop physically and become as self-reliant as possible.

The main area inside the building is a classroom 40 ft. by 20 ft., which may be sub-divided into two equal areas by a sliding-folding door. This door has been constructed of material to render it reasonably soundproof so that two separate classes may operate at one time or a group of younger children may sleep while others are undergoing instructions or are at play. The playroom adjoins the kitchen so that children's lunches may be served to them or suppers served to a group meeting in the evenings.

External view of the pre-school centre showing the projection of the plywood beams to the exterior of the building.

There is a washroom off one end of the playroom together with a store for indoor play equipment, craft materials, etc. The washroom is also accessible from the outdoor play area, so that children may clean-up before going into the classroom.

At the opposite end of the building is a staff room with a large cupboard which may also be



control programme. These industry marks are your assurance that the panel has the physical attributes laid down in the specification for the product.

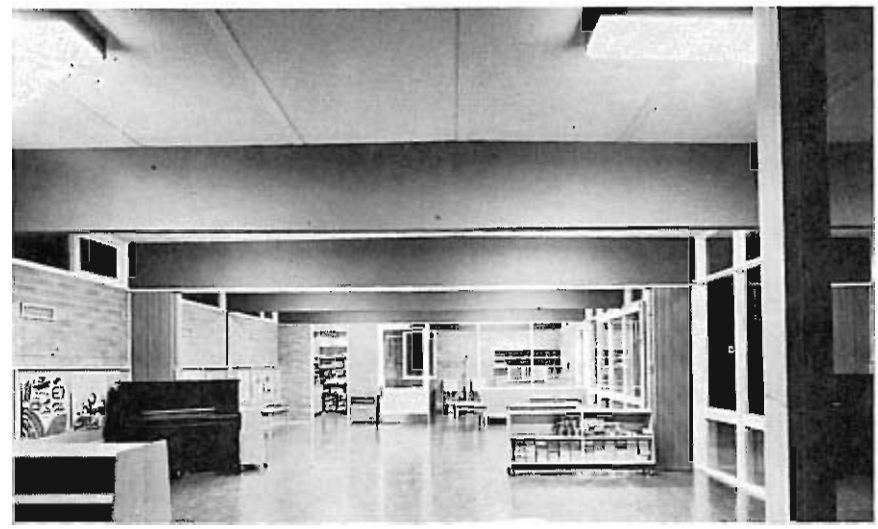
Industry Quality Control

The quality control programme has been described in earlier issues of this publication. Briefly, it involves testing and recording of production processes, testing of waterproof glue bond of plywood from each mill at the industry's central laboratory and checking of dimensions and squareness of panels.

Most important in the programme is an unannounced visit to each mill each week by a quality control officer appointed by the Plywood Association of Australia. His personal inspection of the factory's quality control records is a practical method to ensure that industry methods of mill process quality control are being carried out. Testing of random selected production samples sent into the central laboratory ensures that there is no deviation in the quality of the phenolic resin bond. The waterproof glueline must meet the 72-hour boil test requirements for "Type A" bond as laid down in standards of the Australian Standards Association.

Protection Necessary

No known material is completely impervious to weathering. Fortunately, the natural threats to unprotected waterproof glued plywood are understood and can be countered. The phenolic glueline is unaffected by water, wet conditions, heat and cold. Veneers, however, may deteriorate under adverse conditions. The means of protection depend on the conditions



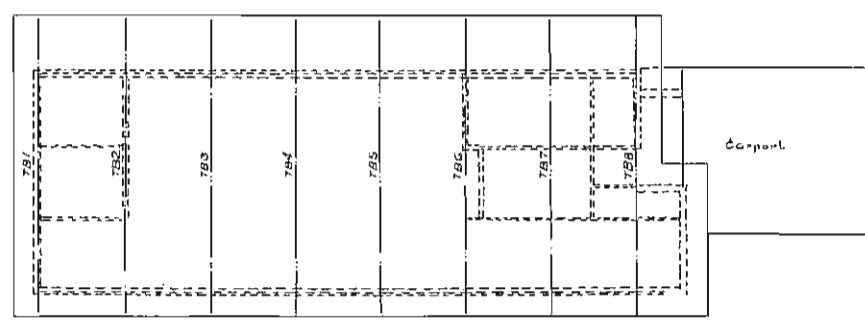
Interior of the Centre. Plywood beams allow greater free space.

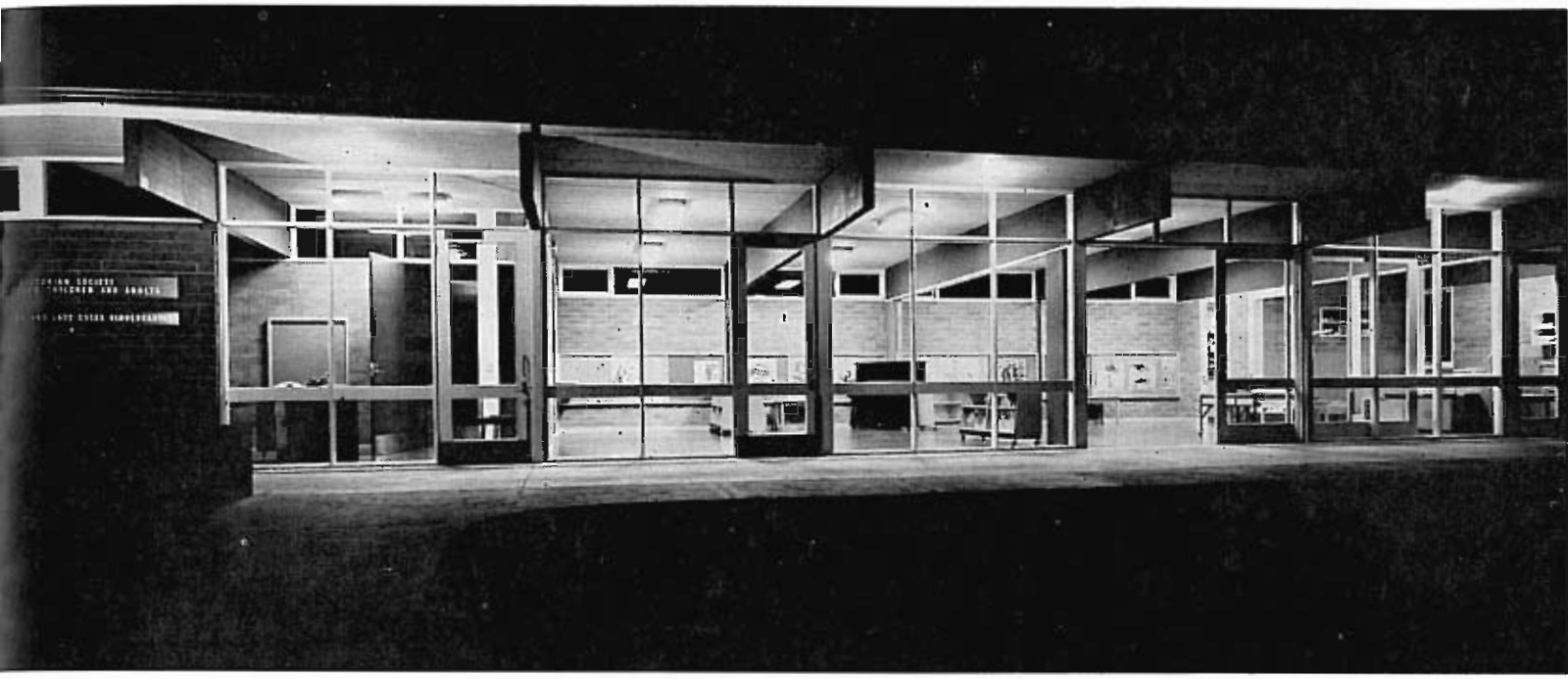
used as a clinic or theatment room by medical officers, physiotherapists or speech therapists. This is also served from the kitchen. In addition, this room may be used as a quiet room by a disturbed child, who can be observed from the kitchen while he is resting.

The choice of materials for the Centre was based on three criteria: economy, efficiency and eye-appeal. In addition to these, they had to form a neutral background to the activities of the children. Because it was absolutely necessary to avoid steps of any kind, the building was built on a concrete raft and surrounded on two sides by concrete masonry, the outer being rough on the exterior, giving rugged character to the building. The roof consists of Stramit board treated with cork granules to act both as a sound insulator and insulation against heat and cold. This is covered with 22-gauge Stramit "Speed Deck".

One of the outstanding features of the Centre is the use of 24-in.-deep plywood beams which span the full width of the building and cantilever 6 ft. over the outdoor play area to protect the children from sudden showers and to protect the full-height windows from the hot summer sun. Eight 35-ft.

ROOF PLAN





box beams have been employed in the post and beam construction. Each has 5/16-in. structural plywood webs according to S.A.A. Code 087 "Plywood for Exterior Use". Resorcinol formaldehyde glues were used throughout and the beams were given one coat of clear lacquer before delivery to the site. Top and bottom chords and internal nogging members are Douglas fir dried to 12% moisture content and the beams employ a 2-in. overall camber (see detail drawings). Beams are supported on 4 in. x 4 in. Douglas fir columns. They are finished naturally. Another consideration for the use of plywood box beams was that a Public Health regulation ceiling height of 10 ft. would have been too severe for children of 3 ft. stature. The beams bring the apparent ceiling height to 8 ft.

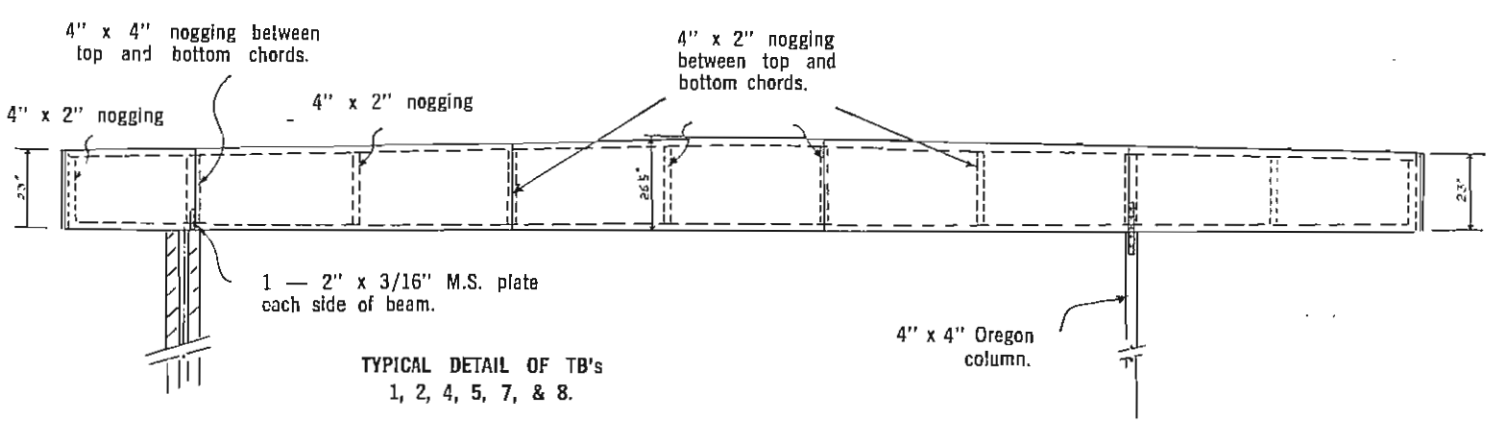
Special permission of the Health Department was obtained to carry the windows down to the floor so that children who have to move about on low trolleys can clearly see activities which are going on in the outdoor play area.

Architect: K. C. B. Bethell, B.Arch., A.R.I.B.A., A.R.A.I.A., Melbourne.

Consulting Engineers: Clive Steele Associates, Melbourne.

Builder: Alfred W. Hunt, Melbourne. ■

Above: The Centre at night. Box beams reduce apparent ceiling height.



TYPICAL DETAIL OF TB's 1, 2, 4, 5, 7, & 8.

under which the plywood is used. Coatings of paint or applications of wax based stain are most common methods, being simple and relatively inexpensive.

It is very important, in many applications, that edges and backs be sealed as well as the exposed faces. These surface finishes are often all that is required to maintain a plywood product indefinitely.

Under conditions of extreme exposure, however, such as flumes, ducts, tanks, boat bilges and other applications where a combination of high moisture content, conducive temperature and lack of ventilation prevail, virtually all timber and timber products need protection against fungal attack. For some years pressure treatment with copper-chrome-arsenical salts or other preservatives such as creosote or pentachlorophenol have been available to plywood specifiers at a premium of 5% to 10% on base cost. This pressure type of preservative treatment is the ultimate if the plywood is to be used without painting in exposed conditions or in water. Such conditions are common in boats, cooling towers and some exterior cladding of buildings. With certain treatments painting is also possible and life of the paint coat is extended.

Dip-diffusion processes developed by the C.S.I.R.O. and brush-on-water-repellant preservatives are also gaining in popularity in many fields of plywood utilisation. The phenolic glueline itself is impervious to fungal attack and insect attack. For that reason phenolic bonded plywoods are virtually free from infestation by insects.

Speciality Protection

Speciality plywood products offer many outstanding finishes, such as medium and high density overlaid plywood, metal faced

PALLETS L

THERE is little reason for apple growers to lose money on the local market.

This is being proved through the success of a novel marketing system being used by a Bridgetown, W.A., farmer.

The system, now in its fifth operational year, entails the packaging of apples in plastic bags, partly lined with fluted cardboard, and the stacking of these bags in a collapsible pallet for rail freight to markets. It was devised by Mr. W. H. Rowan-Robinson of Bridgetown.

The scheme has some important advantages:

- The cost of the container and of packing is cut to less than a quarter of the normal average.
- Reduced handling — no repacking.
- Windows in packs allow buyers to inspect contents.

Mr. Rowan-Robinson now has his system well organised to give a minimum of work and a maximum of effectiveness.

The pallets are built of structural exterior plywood with pine bearers so placed as to enable the whole pallet to be handled by fork lift—an ideal arrangement for the Railways Department. Each holds up to 39 bags (750 lbs. of apples). Ends are hinged and there are no sides.

As apples come into the farm shed they are tipped from the bulk bin into the hopper of the grader. From there they go up the elevator and are collected by a chute which transports them to the rotating plywood table (illustrated). Plastic bags are filled from the table and sealed and placed in position on a waterproof glued plywood pallet. A trolley takes each filled pallet to a truck.

The light, strong plywood pallets have proven the workability of their design by lasting four seasons with little or no damage. Mr. Rowan-Robinson says that they are quite easy to construct.

This season, with the pallets he has sent 3,000 bags to market without any complaints of bruising. This represents a saving of $600 in boxes alone.

Reproduced by courtesy of "The Countryman", Western Australia.

IFT PROFITS

Opposite page: Filling a pack with apples from the motorised revolving plywood table.

Above: Sliding apples into a polythene enclosure.

Above right: A pallet of apples is trolleyed into a railway wagon and a tilting board compensates for the slight difference of level. Hinged ends will be collapsed when the pallet is to be returned.

A collapsed plywood pallet.

■

and plastic faced plywood, fibre glassed plywood and others. Each has a range of applications in commercial and industrial manufacturing and building.

"Approved Interior P.A.A. Plywood Products" are available, some with permanent natural prefinishes developed by Australian paint manufacturers and applied under factory conditions.

Protection and preservation of plywood can be seen to range from the extremely simple to the highly exotic. Economics, service life required and the visual considerations, influence the selection and end use.

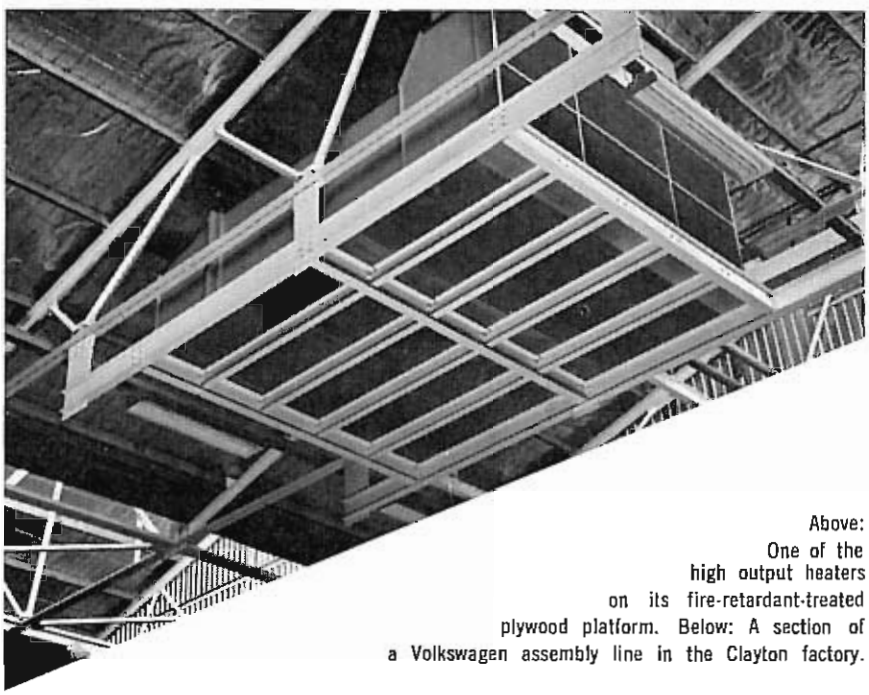
Plastic and aluminium are today combined with plywood to perform many tasks of which the separate materials would not normally be capable. In general, the metals and plastics are used for their durable and protective properties and the plywood for its own structural strength properties to make engineered boards that will command designer interest in the coming years.

The materials with which plywood will successfully combine to provide load bearing strength in two directions are virtually limitless. Through scarf jointing (without significant loss of strength) and newly developed tongued and grooved jointing, standard sized panels extend load bearing properties over even greater areas, e.g., floors.

Real Wood Appeal

Aside from structural and strength properties, plywood, of course, has the luxurious real wood appeal identified since the middle ages with fine furniture and polished panelling. One of the most attractive new plywood products is random matched and grooved wall panelling. This product, fully described in several Plywood Association of

HEATER UNIT PLATFORMS AT VOLKSWAGEN



Above: One of the high output heaters on its fire-retardant-treated plywood platform. Below: A section of a Volkswagen assembly line in the Clayton factory.

VOLKSWAGEN Australasia Limited have entered into the Commonwealth Government plan to increase local content of their popular vehicles. This has involved the Company in a large expansion programme.

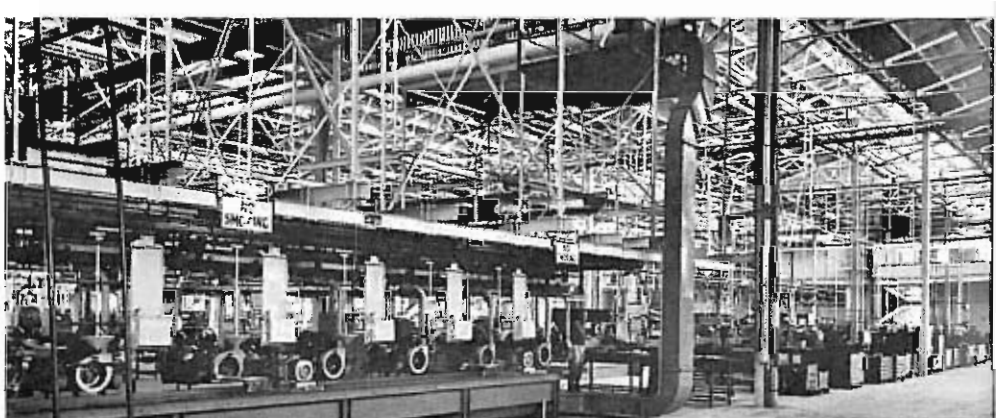
Part of the expansion programme is a new 4,000 square factory building at Clayton, Victoria, for the manufacture and assembly of engines.

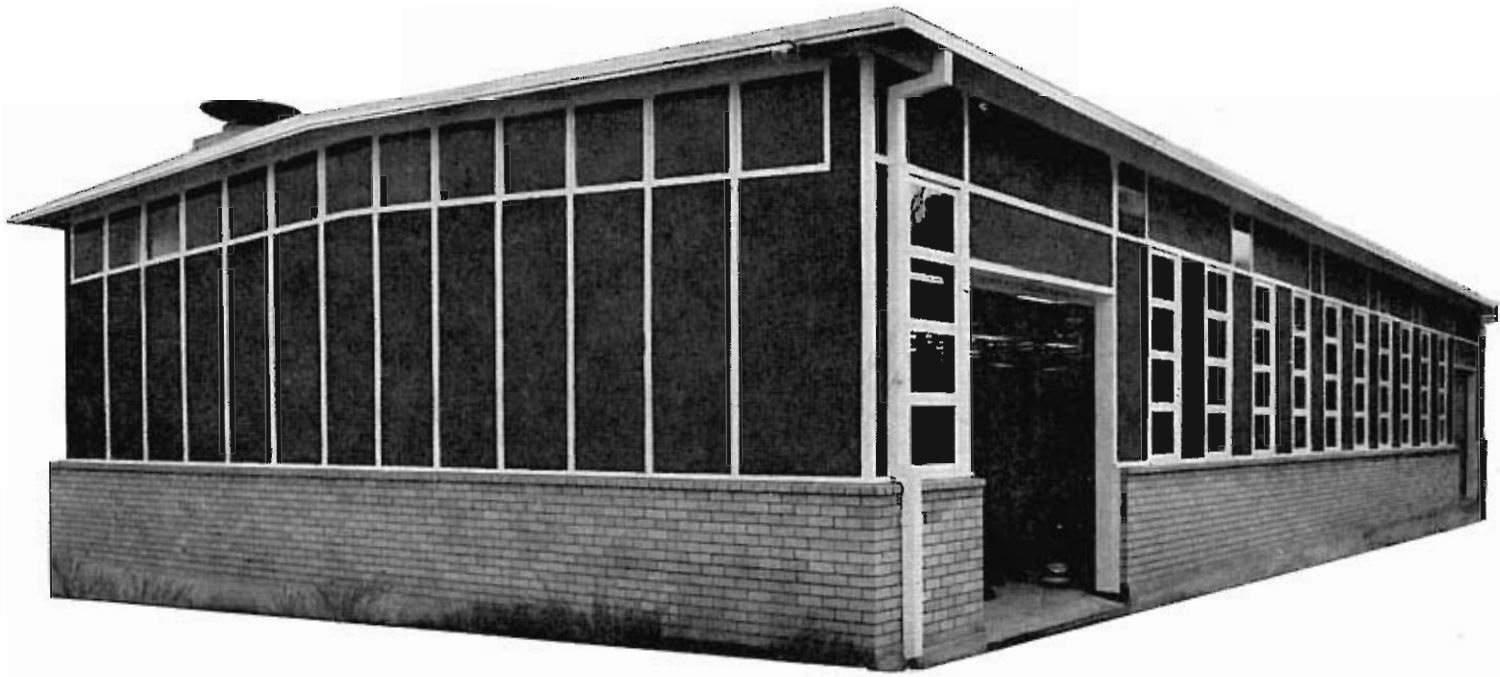
For the comfort of employees during the winter months, 29 high-output heaters have been installed. Each heater unit has a 1,800,000 B.T.U. per hour capacity. They are suspended from the steel roof trusses on structural plywood platforms over R.S.J. frames. Plywood was chosen because it provides a level, continuous deck and because it could be fixed rapidly. It is also strong and does not transfer heat to the steel framing.

The 14 ft. x 11 ft. x $\frac{1}{2}$ in. waterproof glued plywood platforms were dip-diffusion treated with a fosphos fire-retardant liquid.

Architect and Engineers: Graeme Lumsden, Melbourne.

Builders: A. V. Jennings Industries (Australia) Limited, Melbourne. ■





NEW FORESTRY COMMISSION WORKSHOP SHEATHED WITH PLYWOOD

THE New South Wales Forestry Commission's Division of Wood Technology recently moved its carpenters from its headquarters in Harrington Street, Sydney into a new 3,860 square feet building at Putney, about 12 miles away. The move makes more space available in the Harrington Street premises for timber engineering research and the new workshop incorporates the results of two of the Division's recent research achievements, machine stress grading and a waterproof adhesive based on wattle tannin.

The building is of rigid portal frame timber construction, using machine graded hardwood wall framing and machine graded radiata pine nail plate roof trusses. The roof is low pitched and uses galvanised steel deck roofing. Wall cladding is brick veneer to window sill level and marine grade plywood alternating with glazed panels above on the eastern and western walls. The northern and southern walls are all structural plywood above sill height to several feet below roof level, this space being fully glazed. The plywood is used as a stressed skin, eliminating the need for wall bracing and is finished with two coats of Wattyl Forestwood (Madison type) pigmented stain in "red cedar" colour.

The plywood was made up with three $\frac{1}{8}$ in. veneers of negrohead beech bonded with a tannin based resorcinal fortified adhesive developed by the Division and fully satisfying the requirements of the Standards Association "Type A" bond.

The building, illustrated in the accompanying photographs, fronts Pellisier Road, Putney, and is an attractive addition to the other fibro and timber clad buildings on the site. It was designed by the Engineering Branch of the Commission in consultation with officers of the Division. The builder was C. D. Burrows. ■

Australia Ltd. publications, is available in a magnificent range of Australian hardwoods. The panels are prefinished and ready to install; they have the added advantage to specifiers of being subjected to industry quality control. To carry the "Approved Interior P.A.A. Plywood Product" mark, panels must conform to industry standards of bonding, veneer selection, squareness, straightness and finish.

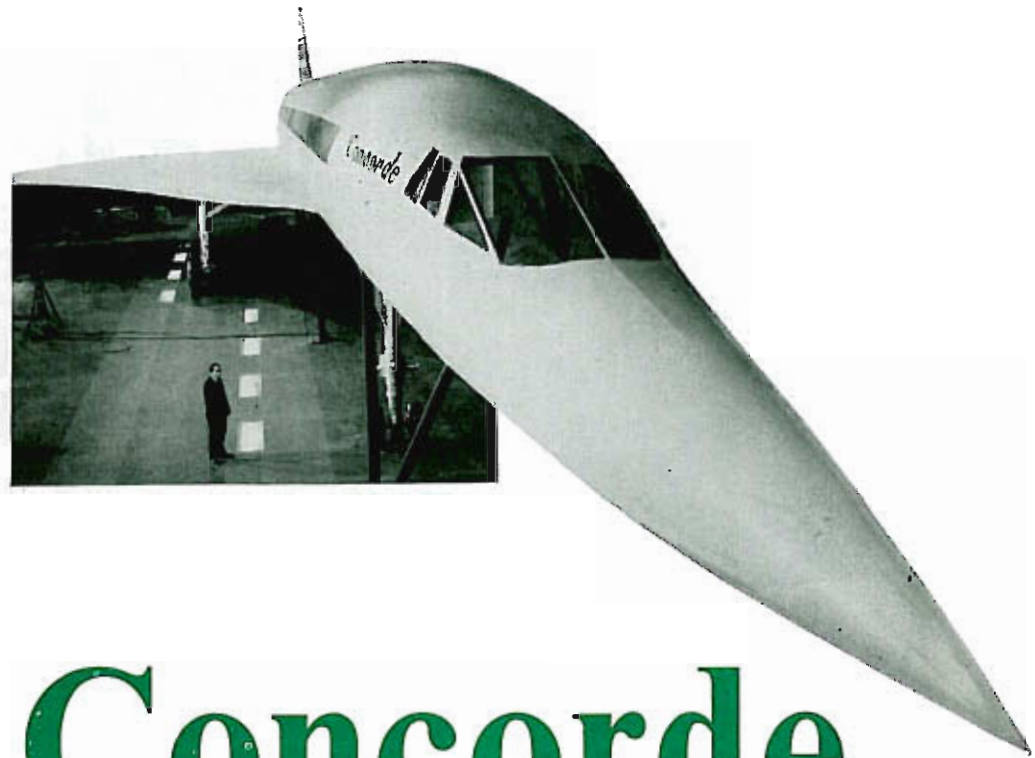
Research on Fire Hazards

Apart from extending the useful life of plywood by finishes, by surfacing with other materials and by preservation, the product's fire resistance can also be enhanced. The best known way to provide high strength and load bearing properties of plywood in a structural component that will also obtain half-hour and one-hour fire resistance as required, is to combine the plywood with acceptable fire resistant materials such as asbestos and/or plaster.

In addition, a low early fire hazard index can be obtained by the use of intumescent paints and/or the pressure impregnation of plywood with chemicals. These reduced spread of flame treatments are now developed and available for use where high fire hazard conditions exist. Testing and research in the field has produced standardised test data from the C.S.I.R.O., Division of Forest Products and the Commonwealth Experimental Building Station.

Versatility with Known Properties

From floors to roofs, from concrete formwork to metal clad components, from shipping containers to fine panelling, plywood is a highly versatile building material. Continuous research



Concorde

A NEW, full-scale fuselage and wing mock-up of the Anglo-French Concorde supersonic airliner was completed in February at the Filton Division of the British Aircraft Corporation.

The mock-up is fully furnished and equipped to production aircraft standards and is considerably more comprehensive and versatile than the relatively simple structure, in use since the early days of the project, which it has replaced. Great care has been taken to ensure that it gives as accurate an impression as possible of the actual aircraft.

The mock-up is constructed of plywood and spruce built around a structural steel framework.

Plywood was chosen to save cost and, more importantly, to expedite the construction of the mock-up. In the highly competitive world aircraft market, delays can cost millions of dollars in orders.

Four main tasks were envisaged for the mock-up: ESTABLISHMENT of the engineering design for the interior; DEVELOPMENT of safety equipment and procedures, which call for the use of a complete passenger cabin; DEMONSTRATION of the operation and manoeuvre of specialist passenger and ground service equipment; and to PROVIDE a realistic sales demonstration aid on which operators can assess their individual layout and equipment needs.

Fuselage frames are in spruce and plywood. The floor beams and intercostals are of spruce and the wing skins, top and bottom are $\frac{1}{8}$ in. plywood excepting the area of the top skin in way of the overwing exits which is $\frac{1}{4}$ in. plywood.

The purpose of the wing mock-up is to enable realistic emergency evacuation procedures (which involve passengers leaving the aircraft across the wing) to be carried out, and the wing structure has been built with sufficient strength to support the weight of at least 40 people.

Interior furnishings are laid on a plywood base, both for ceilings and side walls. The hat-racks are

Precision work in wood: building a Concorde wing and fuselage functional mock-up at the Blagnac, Toulouse works of Sud-Aviation.

The mock-up of the Anglo-French supersonic airliner at the Bristol works of British Aircraft Corporation.

spruce framed and sheathed with $\frac{1}{8}$ in. plywood. Bulkheads and toilet walls are of 1 in. blockboard. Cabin floors are $\frac{1}{2}$ in. plywood.

The mock-up is painted white externally and accurately represents the shape of the standard aircraft.

Total internal length of the mock-up's passenger cabin is nearly 130 ft. with an almost constant width of just over $8\frac{1}{2}$ ft. The mock-up will frequently be used to accommodate up to 140 people and it weighs approximately 13 tons.

Photographs by courtesy of the Central Office of Information, London.

The publishers acknowledge the co-operation of the British Aircraft Corporation (Operating) Limited (Filton Division) in making the above information available. ■

and development extends this versatility year by year.

Plywood, because of its known strength properties in large sheet sizes and the ability to transmit loads in two directions, is an important engineered building material in itself. Combined with other materials which do not possess these properties, or cannot provide them at low cost, waterproof glued plywood becomes a material of unlimited and infinite possibilities.

These possibilities are being realised all over Australia and all over the world. In every conceivable type of construction advantage is taken of waterproof glued plywood's dimensional stability, rigidity, high strength for weight ratio, workability with standard tools as well as thermal and acoustical insulation.

Data on working stresses, fire ratings, preservation, finishes and on speciality products has been developed and is being developed through research and testing.

Technical information is available in published form from the Plywood Association of Australia Ltd., the C.S.I.R.O., Division of Forest Products and the Commonwealth Experimental Building Station.

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—FRAME HOLIDAY HOME DOMINATES SKYLINE

AT QUINN'S ROCKS, about 25 miles north of Perth, Western Australia, one house of unusual design dominates the skyline.

The A-frame house, designed by the Perth architectural firm of Kenneth Broadhurst and Partners for Dr. C. Harold and his family, was designed to make the most of a magnificent ocean view.

The casual carefree styling of the home sets a "getting-away-from-it-all" atmosphere for the true enjoyment of this as yet unexploited holiday area.

The "A" itself consists of four bolted karri frames, with bolted cross-pieces. These cross-pieces are continued across the legs of the frames to tie the whole building together.

Internally, the home is lined with waterproof glued plywood, which extends over the balcony to provide broad eaves. A broad window wall of jarrah looks out over the sea at the front of the A (see photo). Internally, the floor and all fittings are also jarrah, as is the exterior balcony railing.

Spar varnish has been used on all exterior timbers and plywood to provide a natural finish, while clear plastic has been used on all interior timber surfaces and plywood lining.

All in all, the house, though novel in approach, looks extremely livable and comfortable. This feeling is enhanced by the beauty of the natural finished timber construction. ■

The Great BIG Shopping Centre

Left: Perforated plywood acoustic ceiling in the "Gallery" section of Northland shopping centre.

Below: Plywood top hamper fascia facilitates fixing of store names.

A GROWING number of regional shopping centres in suburbs of Australian cities are proving that the shopping chore can be pleasant. In these, a shopper can park close to stores and shop under shelter in air-conditioned comfort. In these vast centres there is a danger of providing an inhuman atmosphere. This is tempered by the injection of artificial pleasantries like piped music and coloured fountains. In conjunction with these elements is the strategic use of natural timber and plywood which is common to most regional shopping centres.

One of the best centres in the recently opened Northland Shopping Centre near the Melbourne suburb of Preston.

Northland is a development of The Myer Emporium Limited which company have sponsored many centres in Melbourne and Sydney.

A feature of the Northland centre is a 6 ft. 8 in. deep top hamper fascia of $\frac{3}{8}$ in. walnut veneer plywood. Two thousand and sixty eight feet of this hamper dress the covered walkaways to provide a "domesticated" finish with a look of warmth and quality, and also to facilitate the fixing of signs and individual store nameplates.

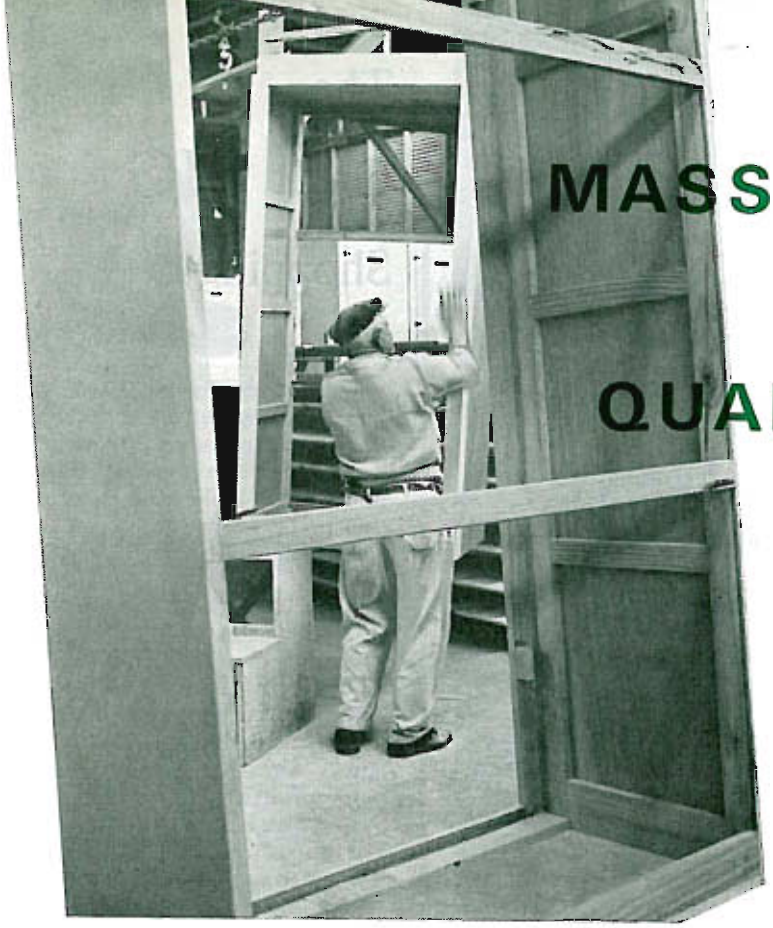
The hamper fascia was delivered to the centre pre-cut and prefinished which effected considerable on-site savings. It was fixed to Douglas fir stud framing at 2 ft. centres with brown lacquered Abel staples, with staple heads parallel to the grain. These staples are thus inconspicuous.

In the "Gallery" section is a perforated plywood acoustic ceiling which is backed by 3 in. of Insulwood and provides the required restful "Art Gallery" atmosphere. This was fixed to a timber joist system suspended from the roof construction, and it blends with the hamper fascia. The "Gallery" is an exhibition mall for paintings and other works.

Architects: Tompkins, Shaw and Evans, Melbourne.

Consulting Engineers: J. L. & E. M. Daly, Melbourne.

Builders: E. A. Watts Pty. Ltd., Melbourne and Sydney. ■



MASS PRODUCTION relies on QUALITY CONTROL

Left: Finishing touches are made to cabinets as they move along the production line.

Below: Sunshine plywood cabinets fitted in a kitchen.

PLYWOOD is carefully graded and checked to become an efficient and economical component in mass produced furniture, fitments and other similar items where the finished pieces of each category must be uniform.

Witness to this is the fact that the largest manufacturer of standardised kitchen fitments in the Southern Hemisphere, Sunshine Cabinet Works Pty. Ltd., have selected plywood for their production.

Mr. George Mochrie founded Sunshine Cabinet Works in 1919 and today Mr. Mochrie leads one of Australia's leading furniture manufacturers, having grown from a staff of one to 250 in 125,000 square feet of factory under roof. There are plans for further enlargement.

The Sunshine factory in Victoria and one in New South Wales mass produce kitchen cabinets and unit furniture mainly for bulk requirements like those of the Housing Commission of Victoria and many large projects of apartments and home units.

It is essential for them that all units are of identical high quality and for this reason plywood is being used. All external sheeting of these units (doors, backs, sides, etc.) are made of plywood and the completed fittings are perfectly matched and permit the application of whatever finish the specification demands without showing the slightest differentiation of surfaces. Some of the fitments are brush painted, others spray painted, some stained, some varnished. Whatever the finish, they always show the same smooth and even surface. ■

7-6-5-4-3-2-1-SLUW!

THE most important thing about the new 46 in. x 46 in. x 61 in. box at the Army's Georges Heights (Sydney) establishment is that it can save lives.

Code named SLUW (Stow it, Load it, Unload it, Work) the box was designed by Sergeant D. A. Reeves who constructed it with the help of Corporal R. P. Elderfield. The design arose from the Sergeant's experience of the requirements of a unit in the field. It is a mobile orderly room which carries files, tables, chairs, waste baskets, a typewriter, a duplicator and enough equipment for three months in the field.

The United States Army uses plywood containers to carry such equipment from base to base, but SLUW goes several steps further.

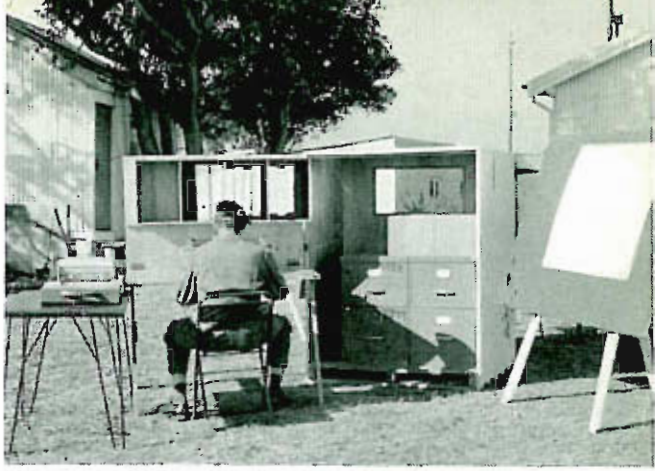
Sgt. Reeves rejected other materials as being too bulky or too heavy. The first prototype was built of timber which required too much cross-bracing. The final model is of $\frac{7}{8}$ in. structural plywood with angle-iron bracing. All seams are fibreglassed, making SLUW completely weathertight. Flooring is $\frac{1}{2}$ in. waterproof glued plywood on a timber pallet. Shelving is $\frac{1}{2}$ in. with $\frac{1}{8}$ in. partitions.

It takes seven minutes or less for two men to unload and set up the unit as photographed, and seven minutes to pack up and re-load.

Fast loading and hardiness of the plywood unit is important if the enemy is approaching. For its contents to fall into enemy hands could be damaging. Thus if time is particularly critical the unit can be liberally soaked with petrol and ignited. It is easily painted with a camouflaging green paint.

There are many amendments which could be made to the design, but the unit has been tested in exercises and it works admirably. The design has been submitted to Army Headquarters for consideration and further evaluation. In mass production it could be made still lighter and its storage capacity could be increased.

SLUW should be a worthwhile contribution to the efficiency of Australia's Army.

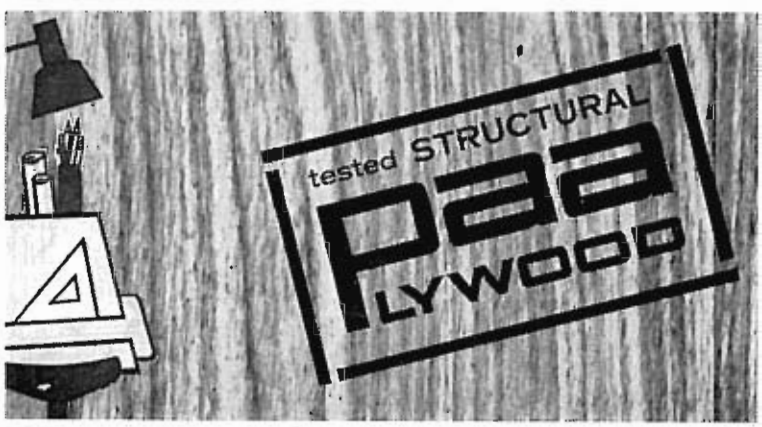


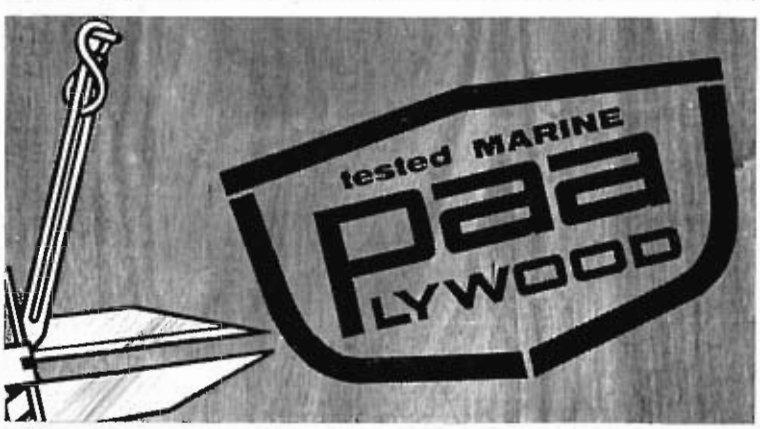
From the top: All systems go! ½in. plywood partition separating major side from Chief Clerk's side contributes rigidity when SLUW is open for action.

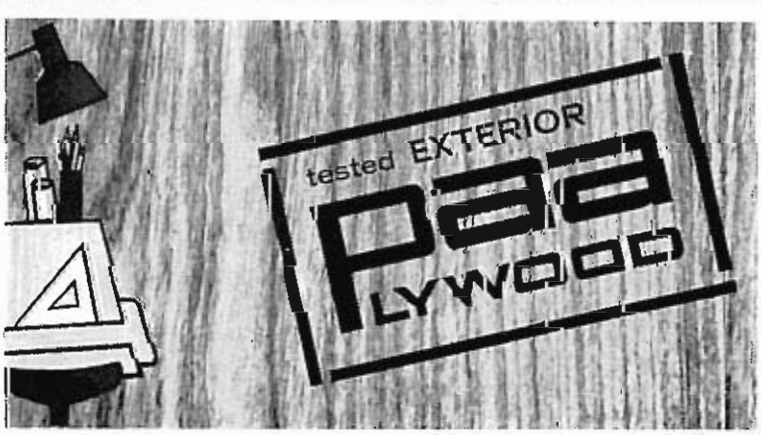
All sections and compartments fold up into the box.

SLUW is completely watertight when packed.

The pallet built into the base facilitates lifting by forks or manpower. SLUW weighs half a ton complete with equipment.







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Plywood industry quality control means rigid industry inspection. Look for the paa marks of tested plywood quality.

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Ask your regular supplier about prices and deliveries of the paa Plywood of your choice. Look for the industry mark!

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