

Several types of polyols can be produced by MPOB's pilot plant (800 kg capacity per batch). The polyols are obtained by reacting epoxidized palm oil with a short-chain alcohol, such as glycerol or ethylene glycol. These polyols can then be reacted with suitable isocyanates to give a variety of polyurethane (PU) products. The PU products can be rigid, semi-rigid or flexible and are suitable for industrial sectors like building industry, furniture, decorative and automotive parts (*Figure 1*). To date, MPOB has produced products like ceiling panels, sandwich boards for wall panelling, dry flora foam, thermal insulator for freezers and flexible soft foam for furniture and others.

PALM-BASED RIGID PU FOAM

Blended palm-based polyol in a certain ratio with a suitable petrochemical-based polyol is reacted with suitable isocyanates in the presence of a blowing agent and additives to produce palm-based rigid PU foam. The blended mixture is poured into a mould of the desired design. *Table 1* shows the properties of the polyols used to formulate moulded palm-based rigid PU foam and the properties of the product are shown in *Table 2*. The advantages of this moulded palm-based rigid PU foams are that they are wood-like in appearance, impervious to moisture, dimensionally stable and can be sprayed or painted with the desired colours.

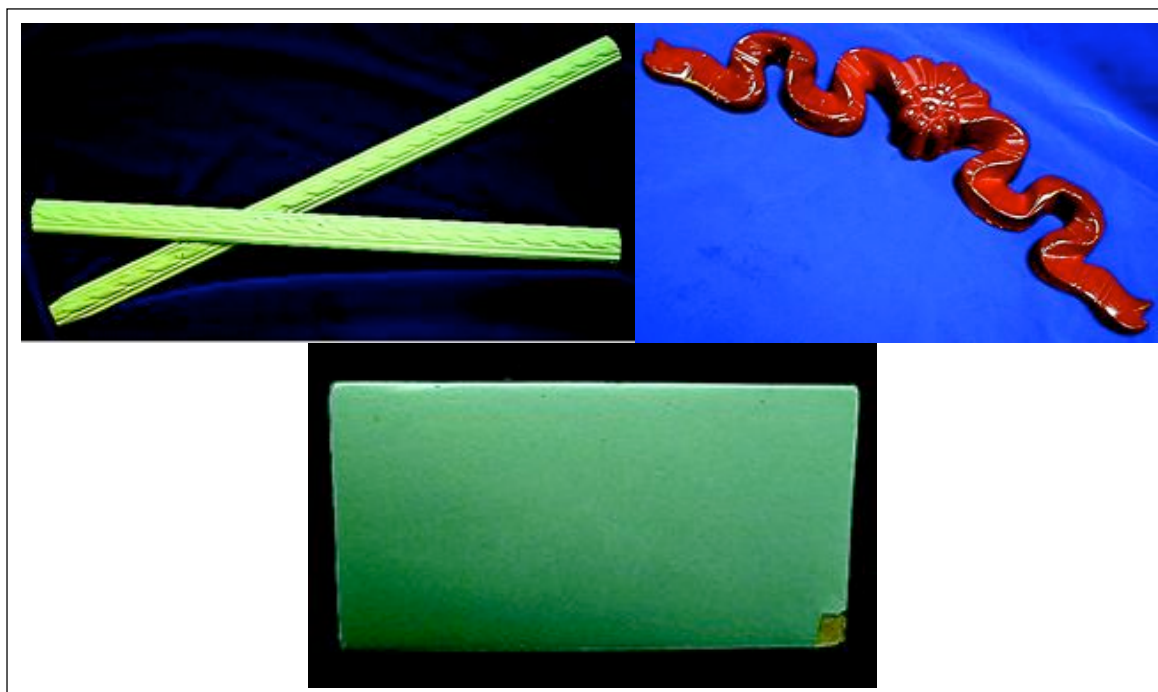


Figure 1. Moulded rigid PU foams

TABLE 1. PROPERTIES OF THE POLYOLS USED IN THE FORMULATION

	OHV, mg KOH g⁻¹	Acid value, mg KOH g⁻¹	Molecular weight, g per mole
Palm-based polyol	149	8.9	<1000
Petrochemical-based polyol	400	0.05	<500

TABLE 2. PROPERTIES OF THE MOULDED PALM-BASED RIGID PU FOAM

Density, kg m⁻³	Hardness, shore D
380-400 (Commercial: 100-1100)	50-55

POTENTIAL APPLICATIONS

One potential area of application is decorative or structural parts. It has the same appearance as wood, is of no nutritional value to insects, impervious to moisture and does not shrink, rot or decay. In build-up by joining together many smaller pieces of wood, PU can provide a similar result in a lightweight one-piece installation. The

advantages are lower installation, caulking and painting costs with better performance.

CONCLUSION

Blending palm-based polyols with a suitable petrochemical-based polyol and isocyanates produces a palm-based rigid PU foam with acceptable performance.

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