

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF A NEW
COATING RAW MATERIAL BASED
ON A MIXTURE OF EPOXIDIZED
PALM OLEIN AND DIGLYCIDYL
ETHER OF BISPHENOL A**

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.


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ABSTRACT

Epoxy coatings are highly in demand due to their excellent corrosion protective properties. Currently, raw materials for epoxy coatings mainly originate from diglycidyl ether of bisphenol A (DGEBA), a compound derived from petrochemicals. However, health concerns associated with bisphenol A, combined with the limited supply of petroleum are driving researchers to look for alternative raw materials. Plant oils are considered as potential alternative resources to generate more environmentally-friendly coating formulations. This study aims to investigate the possibility of developing a new raw material for coating using a mixture of epoxidized palm olein (EPO) and DGEBA, and subsequently evaluate the resulting coating film's properties and performance. The main study was done in four stages. In the first stage, coatings containing 0-30 wt. % EPO were formulated and applied on mild steel plates. The coating was then tested for adhesion, hardness, chemical resistance, water resistance and solvent resistance. The third and final stages consisted of EIS study and performance tests, respectively. The EIS study shows that the corrosion protection from EPO is comparable to that of a conventional epoxy coating. Natural weathering test was carried out for 90 days while a cyclic salt fog/UV exposure test took place for 30 days. EPO30 did not show any sign of rusting or blistering upon exposure to both weathering conditions. Weathering study indicated that EPO imparted to the EPO/epoxy coating a higher tendency to discolor upon weathering in comparison on conventional epoxy coatings. Nonetheless, EIS response and weathering test results suggested that EPO30 performed as well as conventional epoxy coatings in protecting metallic substrates from corrosion.

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