



**An overview
of
Protective Coating System
For the Wind turbine Industry
By
Rajendra Khanolkar
Kansai Nerolac Paints Ltd.**



A Brief History of Kansai Nerolac Paints Ltd.

| | |
|--------------------------------------|--|
| 1920 | Established as Gahagan Paint & Varnish |
| 1933 | Acquired by Lead Industries Group, UK |
| 1946 | Name changed to Goodlass Wall Pvt. Ltd |
| 1957 | Name changed to Goodlass Nerolac Paints Pvt Ltd |
| 1976 | Forbes Gokak (Tata Group) acquired a part of the foreign shareholding |
| 1986 | Kansai Paint Co. Ltd, Japan bought out the share of the UK partner. |
| 2000 | Forbes Gokak (Tata Group) divested its holding in favour of Kansai Paint |
| 11th July 2006 | Name changed to Kansai Nerolac Paints Limited |

An overview of our association with The Wind Turbine Industry in India

Nerolac Paints were the first Indian paint Company to coat Tubular Towers in India in a big way

Main coatings solution provider to the Industry in India since 1996

Standardised coatings as per Specifications by

Continuous Innovations/up-gradations

Up-gradation of application skills at vendors

Continuous technical supervision & support

Successful partnership with the leading manufacturers to establish corrosion protection at their vendors over the last ten years

Coated over 1600 towers till date

Challenges In India

Constraints a few years back

Inadequate infrastructure

Contamination during painting

Application defects & rework

Unskilled personnel

Damages and hold up



Challenges In India

Algal attack post erection – a menace

Ruining the aesthetic appeal

Severe reduction in gloss

Change in shade

Extra cost to wash manually



Challenges In India

Very severe field operating conditions in wind farms



HEAVY RAINFALL AREA OF SOUTHWEST INDIA



EXTREME TEMPERATURES OF DESERTS IN

NORTH WEST INDIA



SEVERE COASTAL SALINITY OF INDIA

Our contribution to the Industry

To ensure optimal quality of painting,

Nerolac in association with leading wind mill manufacturers embarked upon

a detailed exercise to educate and standardize painting procedures at all the vendor locations and

Wind farms

Efforts to create awareness of good coating practices

Improvements over the years

Worked closely with leading manufacturers and their vendors to upgrade facilities.

These actions were further strengthened through interactions with Ameron USA during their periodic visits to India

Work instruction tailor made to suit conditions at vendor premises were created by Nerolac

Periodic audits by Nerolac representative to ensure implementation of the work instructions ensured desired results.

Training programs for applicators and QA persons at vendors



Specific Improvement Projects

Improvement in Amercoat 4124 -Topcoat to enhance algal resistance without compromise on gloss and performance

With the help of Microbiology Dept. evaluation of various biocides & a series of testing was carried out.

Up graded product Tested as per SS 345 (Singapore standard) for

Excellent Results at site

Sample tower painted with this upgraded topcoat was installed at Satara in 2002.

After one full monsoon, when observed in 2003, there is no Algae growth on this tower.

Radiator painted with earlier topcoat showing the growth of Algae.

Algal Resistance -



Key initiatives in monitoring the coating performance at Windfarms

- Adherence to prescribed survey schedule of the various wind farms all across India to assess performance under actual weathering conditions
- Recording & preserving the data to analyse and simulate such conditions at our in house laboratory to assess and monitor behaviour under aggressive climatic conditions
- Training programs at wind farms for site maintenance personnel
- Design and provision of Repair kit for on-site maintenance of the coating system on towers

Kansai Nerolac Paints

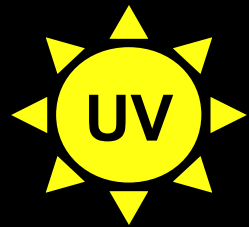
introduces the latest in Technology

from Ameron U.S. to

the Indian Wind Turbine Industry

What is prevalent today is a 3 Coat System

The urethane adds color and gloss stability to the coating system and reduces loss of film thickness due to chalking of the epoxy. If an epoxy had the weathering properties of urethane, would we need to apply a urethane over it?



Barrier coat

Polyurethane topcoat

Epoxy intermediate

Zinc-rich primer

Steel Substrate



Galvanic protection

“ BREAKTHROUGH ”

Weather Resistance

Corrosion Control

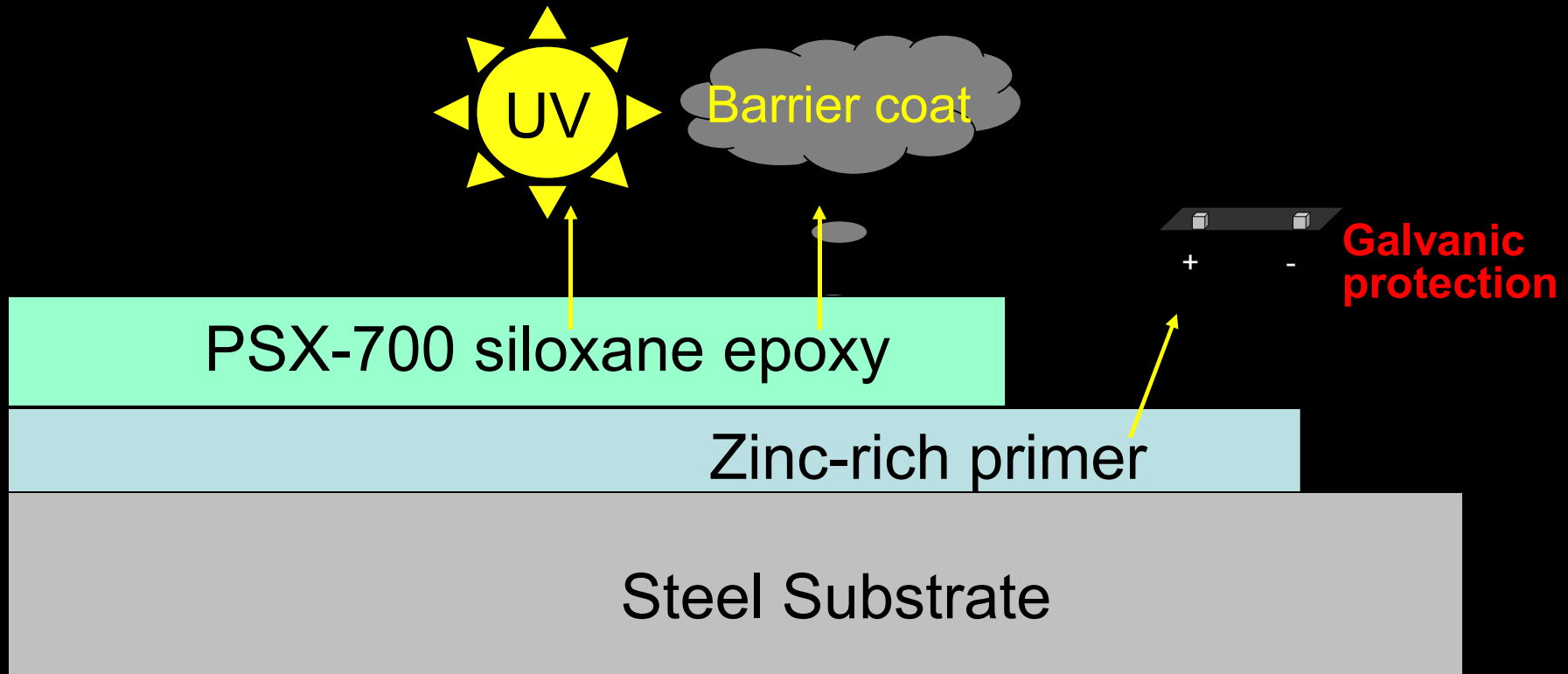
Superior color & Gloss Retention

PSX 700 – Engineered Polysiloxane Coating

- **Epoxy/siloxane hybrid coating that enhances the best characteristics of epoxies and aliphatic polyurethanes**

Plus

Using PSX Can Reduce a 3-Coat System to 2-Coats

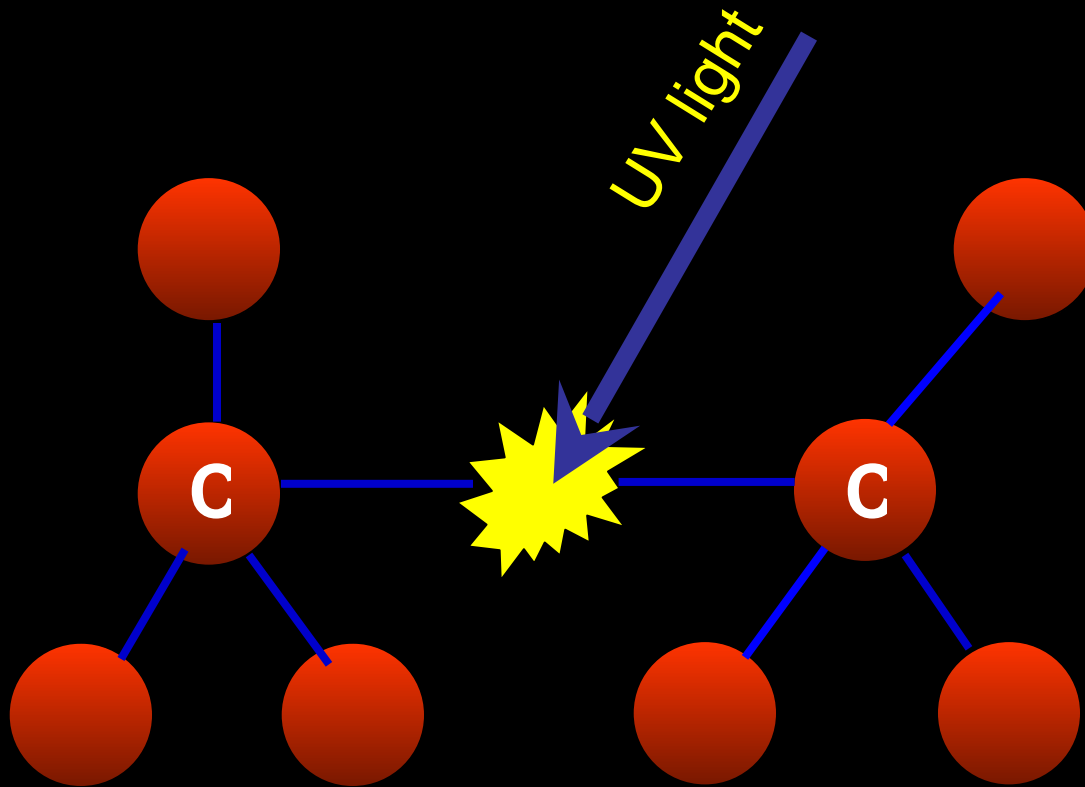


$$1 + 1 = 3$$

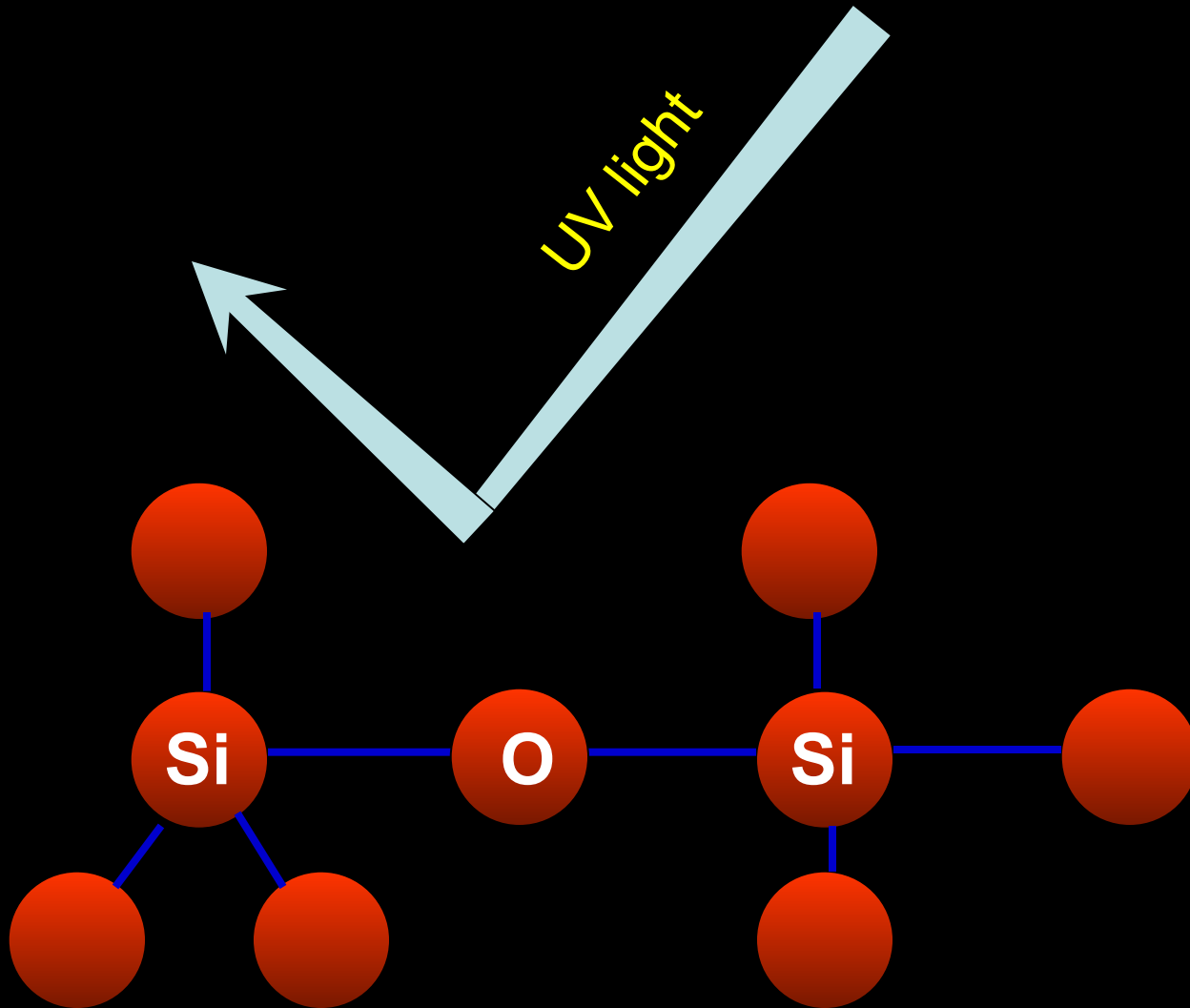
Advantages of Siloxane Coatings over Traditional Organic Coatings

- The Si-O bond is very stable and resistant to attack by atmospheric oxygen even at very high temperatures whereas an Organic polymers will oxidize and degrade under these conditions.
- The Si-O bond is unaffected by Ultraviolet radiation resulting in excellent weatherability exceeding any organic polymer.
- Siloxanes have excellent compatibility with inorganic substrates.
- Siloxanes are hydrophobic – good water repellent

Organic Topcoats



Inorganic Topcoats



Why Polysiloxanes

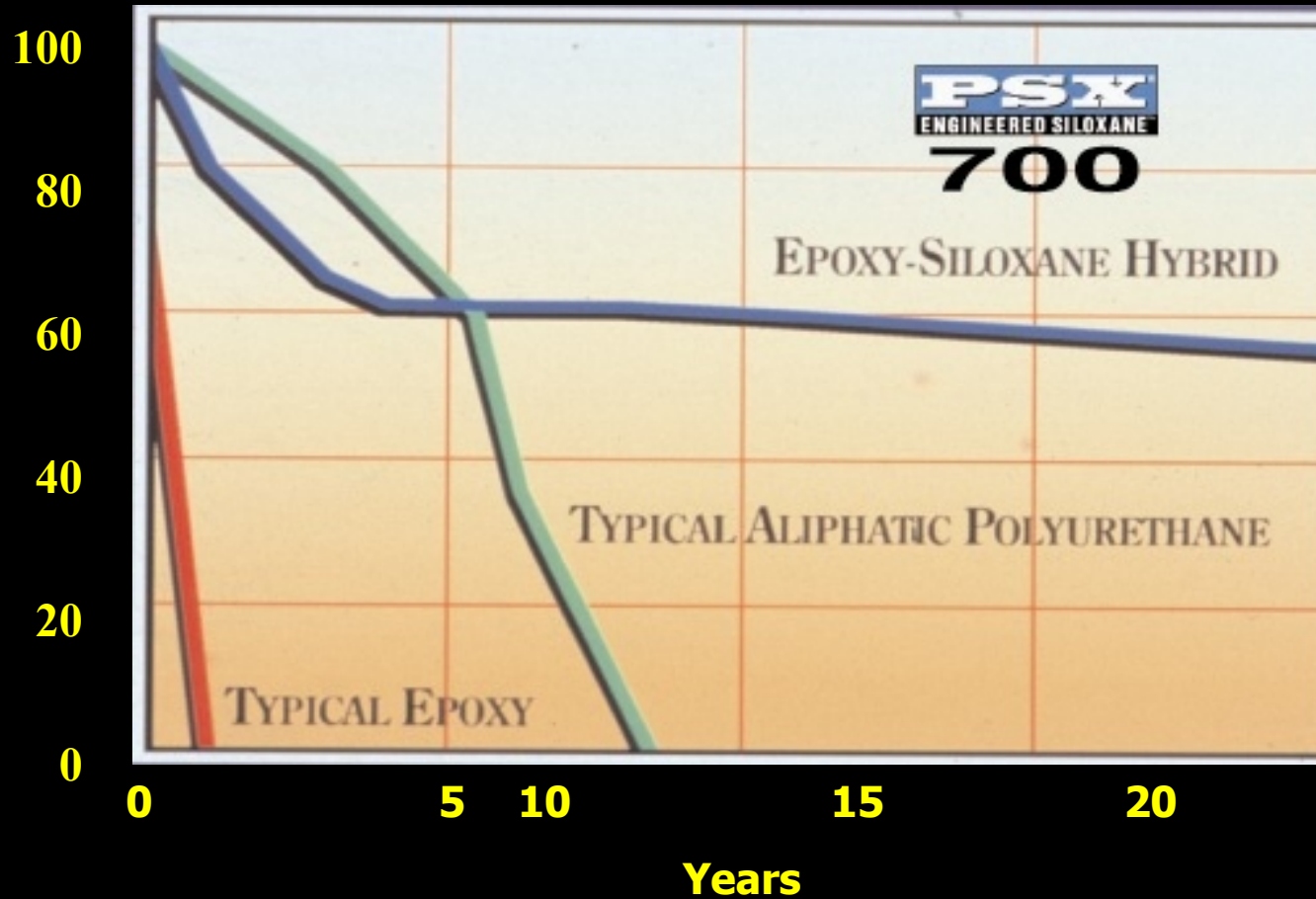
Service Life Projections

| System | Number Of Coats | Conditions | Years of Service |
|-------------------------------|-----------------|------------|------------------|
| Zinc Epoxy Polyurethane | 3 | Moderate | 10 |
| | | Severe | 6 – 8 |
| Zinc PSX | 2 | Moderate | 15 – 20 |
| | | Severe | 10 – 15 |

PSX 700 QUV Accelerated Weathering Graph

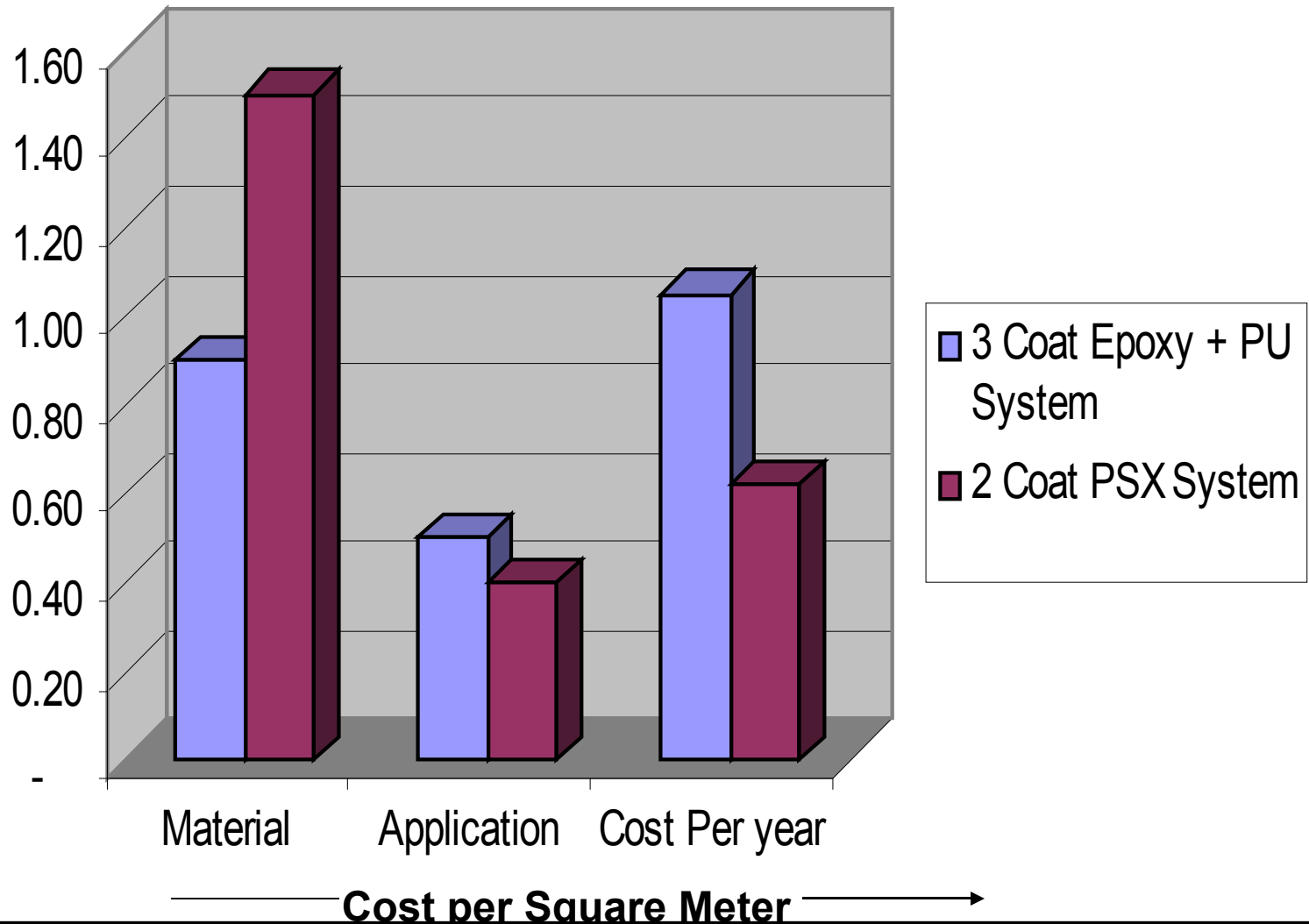
Gloss %

Accelerated Weathering Test



Cost savings-Indicative purpose

3 Coat Epoxy / PU System Vs. 2 Coat PSX System



So why Nerolac ?

KNP Technical Support Infrastructure

- Robust development infrastructure with over 175 paint technologists with formulation and product application expertise.
- Dedicated team with NACE certified engineers to cater and focus exclusively so that wide network of vendors/suppliers are supported without any interruptions
- Multiple manufacturing locations – Uninterrupted supplies even under adverse conditions – Low dependency on imports
- Periodic visits from Ameron technical representative to India and audits of vendor sites.

Our request to the Indian Wind Turbine Fraternity

“ Lets join hands and work towards a cleaner tomorrow ”

Thank you WISE for giving us the opportunity



Thank you for your attention

