Mechanical Strength, Wear Behaviour and Corrosion Properties of Graphene Reinforced Nano Polymer Composite Materials

Jeevanantham R*, Dhanavendhan T, Elavarasan P, Prasanna S.C
Department of Mechanical Engineering, M.Kumarasamy College of Engineering, Karur, Tamil Nadu, India
***Corresponding author: E-Mail: jeevamecha50@gmail.com**

ABSTRACT

Traditional materials can be replaced by composite materials because of its superior properties such as compression, tensile strength, high strength to weight ratio and more economical. Among the composite materials the polymer based composite look forwarded to researchers.

The collection of large number of units along with their molecular structure is termed as a polymer. In polymer method they have been mixed with a graphene oxide, with the help of an additive in order to make a strong bonding. The graphene have high corrosion resistances and they have been easy to manufacture a complex shapes.

We have planned to apply our composites on a globe valve, and their stem have been get corroded on their day today life. In which there have been small leakages on their stem. And entire valve have been get corroded. In order to avoid their leakages and corrosion. We have been planned for manufacture on a polymer composite. Which have high corrosion properties and strength.

And we planned for testing on a tensile test, compressive test, wear test, corrosion test, impact test, scanning electron microscope and transmission electron microscope.

KEY WORDS: graphene-polymer matrix composites, polyester.

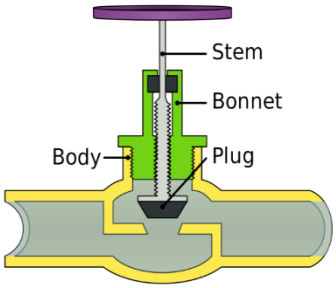
1. INTRODUCTION

The polymer have been arises from a Greek word. The polymer contains a long chain molecule along with a large number of identical structures. Large number of polymers are located in nature are arrived from synthetic routes.

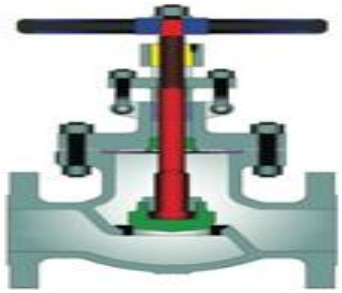
Polymers are formed from the ambient conditions. And they were used as elastomers. And they were mostly used for textile applications. And now a days they were plays a vital role in world wide applications. Based on their performance they have been classified into two types.

Problem Identification: Normally globe valve was manufactured by a cast iron, brass, etc. due to which flowing globe valve failure may occurs often.

Diaphragm may often get corroded: The scraping may cause due to corrosion. Due to padding gland leakage there may be a chance for valve stem to bend.



a



b

c

Fig.1. Parts of Globe valve (a, b, c)

Polymers:

Introduction on polymers: The word polymer is arrived from a Greek word. A Polymer is a large molecule that combines by a covalent bond.

Mechanical Strengths:

Bond distance is .142 nm long = very strong bond.
Strongest material ever discovered.
Critical tensile strength is high.
Also, graphene is very flexible, yet brittle (preventing structural use).

Table.1. properties of graphene

Absorbs 2.3% white light
Optical electronics absorb <10% white light
Highly conductive
Strong and flexible

Fig.2. graphene powder

Graphene structure: Graphene remains a crystalline allotrope of carbon. The carbon atom of graphene structure is very closely packed.

Graphene's structure has been in various forms. And their structure has been classified based upon their nano meter. And now a days they have been used in a various applications.

Applications of Graphene: Typical applications Graphene include: OLED Technologies, Body Armour, Lightweight Aircraft/vehicles, Photovoltaics, Superconductor/battery, Filtration, Integrated circuits.

2. CONCLUSION

Polymer composites have been widely used in many kind of places like engineering applicants, aerospace etc., and they have been plays a vital role in our day today life. The valve stem have been manufactured by a polymer composites with a combination of graphene and poly ester, and its mechanical, corrosion and wear behavior have been studied.

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