

Abstract

No engineering deployment is bodiless. Just as the human spirit has a vehicle for actualization in its deployment into this world to perform its God-given destiny, so do engineering concepts need vehicles for deployment in service. In man's quest to subdue and have dominion over the earth as ordained by God (Genesis 1:26-28), materials that help actualize engineering designs must keep pace with ever-changing stringent service conditions. Materials specification will depend on the area of deployment of the equipment. Thus, in the example of designing and manufacturing a heart valve, the corrosive influence of blood and body fluids, loads and fatigue loading on the valves and effects on associated tendons must be taken into consideration before tissue-growing or additive manufacturing of heart-valves. In the stride to reduce obnoxious effluents from coal-powered plants, materials of construction of the boiler superheater tubes must be able to withstand the severe conditions of fireside coal-ash interaction with the heater tubes.

The term 'Engineering' today can no longer be restricted to the traditional definition. Engineering today can be defined as the application of scientific, economic, social, and practical knowledge to design, build, and maintain structures, machines, devices, systems, materials and processes (definitions.net). Thus, an engineered biological system needs a vehicle(s) of deployment for actualization. The computer age we are in has drastically reduced 'product' development time as different development stages are no longer sequential but run concurrently. However, in the race to cut down costs, product development time, and time-to-market, the process is still heavily dependent on the availability of adequate material. The product development process could be bogged down if novel material needs to be developed as in space systems and near-zero-carbon emission coal-powered plants.

As far as man continues to be unsatisfied with his present 'tools' for useful life, expedition and discovery purposes, there will always be researches into new and suitable materials for such 'tools'. Thus, my work in the field of Materials have been geared towards solving industrial and societal concerns. These contributions can be classified into four groups: Manufacturing processes, Direct Local needs, International concerns and University research needs.

