Composite Materials – Global Technology of the Past, Present and Future

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The field of fiber-reinforced composite materials has been a global pursuit from its very beginning in the early 1950's. In Japan, Hayashi pioneered this field as an opportunity to develop new materials for aeronautical applications, but it was not until the PAN based carbon fiber was invented in the United Kingdom and Japan in the 1960's that true promise of fiber reinforced composites was assured. Today the field of carbon fiber composites dominates military aircraft and appears on the threshold of a similar accomplishment in civil aviation with the development of the Boeing 787 and Airbus 380 aircraft.

In the present paper, the evolution of composites applications in aeronautics from Hayashi's earliest work to the present will be discussed. Statistics will be presented to illustrate how the composite materials technology has developed as a global technology with worldwide participation of academic and industrial scholars.

The barriers and challenges for the successful integration of these emerging technologies into 21st century aerospace vehicles will be discussed. Highlights of on going research will be presented to illustrate recent research advancements.