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FEA-Finite Element Analysis by Kimberly Smith

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Finite element analysis is a method in which various complex engineering related problems are seen upon by subdividing into parts or finite elements. This helps us to make problem solving task simpler and easier as it is already subdivided. By dividing the complex problems into finite elements helps in converting complex differential equation which are very difficult to solve into simpler linear equation which can be easily solved by various methods available for solving linear equations.

FEA is nowadays considered to be the most simpler and convenient method for solving complex engineering problems and so FEA is incorporated by almost all type of industries in the world.

Finite Element Analysis is mostly related with the stress analysis and nowadays also referred to as stress engineering. The name Finite Element Analysis only suggests that it means the analysis of number of finite elements together by dividing into sub parts. One can also look upon FEA as the method of calculation of how much maximum stress an object or material or a substance can easily bear. Earlier in 80s and 70s FEA was only used by limited firms like aeronautics, and nuclear industries. Now a days after the invention of the Super Computers, FEA is mostly preferred by chemical industry, Refineries, Power industries, Oil and Gas industries, Automotive as well as Plastic , Packaging and Electronic industries.

FEA â€“ HOW IT WORKS?

FEA normally consists of a 3D model created using advanced software. In FEA , such 3D models are stressed and loaded as per clientâ€™s loading conditions and thus checked how much stress and load it can bear giving out put results in terms of reports.

FEA can be done on following types of design models:

1. FEA for new product/Structure design models.

In this finite element analysis is done for the new product designed for the first time and such 3D models have to undergo certain stresses as per clientâ€™s specifications before initiating actual manufacturing or construction. FEA also suggests different design modification in case of failure.

2. FEA for existing products/structure design model.

Here FEA is carried out for the products or structures already manufactured or built. FEA is done for such products and structures in order to incorporate the changes in already existing design. FEA also helps in determining the modifications to be made in already existing structures / products as per clientâ€™s requirements and also in case of failure.

FEA basically consists of complex wire mesh type structure consisting of much number of nodes/points. In such FEA structure each point undergoes different stress as per loading required by the clientâ€™s side and thus structure / product is examined whether it bears such loading condition or else it fails.

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