

1 Summary

Pro/E Mechanisms and MSC Adams are two MBD dynamics analysis (MBD) software packages. Analyzing the motions and reactions due to those motions is an important step in the design process. Simulating these motions can reduce design time, improve product performance and reduce risk for failures.

Adams is a program which exists for more than 25 years, and has evolved from a text based solver into a fully functional software package with endless simulation possibilities. Adams still has the functionality to add self-made toolboxes for specific simulation specifications.

Adams is a software package, which is part of the MSC product line. MSC offers a wide range of products of specific model analysis software (CAD, FEM, CAE) to be able to fulfil all needs of the modern engineer. The models created in an Adams program can be used in other products of the MSC family. The standard Adams feature is Adams View. MBD models are constructed and simulated from the GUI.

Some of the other options (extra plugins) are;

- Adams View ; standard modelling environment for simulation MBD motion
- Adams Car ; car specific module, vibrations, comfort and handling
- Adams Rail ; specific rail guided contacts to analyse stability and vibrations
- Adams Control ; analyse control systems for example in robot motion controllers

Mechanisms is a plug-in for the CAD program Pro/Engineer. Models are built within Pro/E and can be simulated by switching from 'Standard mode' to 'Mechanisms mode'. This plug-in is a recent feature, Pro/E tries to expand functionality of the CAD program. Instead of creating a product tree, Pro/E aims to offer a complete engineering package, ran from their basic program Pro/E.

For FEM analysis and MBD analysis extra plugins need to be purchased, there is no need to buy extra software packages.

Both programs are evolving from specific software packages into CAE software, which combines the common used engineering tools into a single program.

1.1 Theoretical Comparison

The training guides for both programs are compared to get a clear view on what both companies are offering with their programs. The practices covered are a user his/her first impression on what is possible, what can be done and how it needs to be done. The training guides both are interactive; the user has to finish incomplete models which are included with the training guide. A downside on the Mechanisms training guide is the user needs to cover the basic Pro/E training guide if there is no experience in working with Pro/E CAD. The Mechanisms only covers MBD specific features. Basic operations as moving, dragging, saving and assembling CAD models are not covered in this training guide.

Adams its training guide covers all features of Adams View, starts at the basis and ends with complicated models in almost 400 pages with 12 extensive practice models.

The guide starts the contents of Adams, where it is originated from and what the goals are for the training guide. The more complicated models are halfway modelled, which the user has to finish and simulate. Other models need to be build from the start, which are the simpler models.

To complete the training guide exercises does take lot of time, but all Adams View features are covered.

More difficult features as automatic optimisation are covered shortly; it is up to the user to practice with the optimisation procedure.

The *Mechanisms* training guide focuses on how to convert an existing CAD model into a MBD model. This covers how to make CAD models flexible, how to limit DOF in a model. CAD models are static models, and MBD models have moving parts.

All models are halfway modelled; building models from an empty screen is not taught in the training guide. Therefore the user has to be familiar with building CAD models in Pro/E, otherwise this training guide also must be completed.