The Digital Product Experience
CATIA Mechanism Simulation

Because every small aspect of detailed design needs to be given careful consideration, the mechanism definition and validation process is time consuming, while collaboration is rather complex.

With CATIA Mechanism Simulation, you can clearly work with detailed designs productively and concurrently. With the help of the fully-automated Assembly Design workbench, product engineers and designers can create mechanisms from connections that have already been defined. The functional check and validation of mechanisms may be carried out interactively or by running a kinematic simulation. This is processed concurrently with the Assembly Design workbench that offers powerful post-processing tools such as clash analysis, distance computations, trace, and swept volume generation of a moving part.

Customer benefits

- Ensure consistency and productivity thanks to integration of mechanisms with the Assembly Design workbench
- Define kinematic mechanisms with high quality
- Ensure powerful kinematic analysis with the simulation object
- Experience concurrent engineering and lifecycle management of kinematic objects
- Permit several simulation contexts for a single product
- Ensure excellent legibility of the mechanisms interactive check
- Evaluate mechanisms with the ability to drive under-constrained systems early on
- Analyze assemblies with precision, for instance, flexible sub-assemblies

Key capabilities

Direct reuse of assembly design constraints to define mechanisms
Engineering connection allows mechanism definition with a seamless integration between kinematic joint connection and design constraint connection. It guarantees full consistency of the assembly definition and compelling productivity.

Wide variety of possible mechanisms definition
You can define a wide variety of kinematic mechanisms thanks to 15 different types of joint connection.

Scenario definitions, animations and probes specified by the simulation object
The creation of the simulation object enables you to create kinematic scenario set-ups via different remaining Degree Of Freedom (DOF) driving excitations. The user can also leverage knowledge-based excitation laws, display animation preview with video player-like capabilities, generate persistent animations, and perform dynamic clash detections.

Full PLM integration of kinematics objects
Kinematic data such as joint connections or mechanism representations can be accessed concurrently as they benefit from PLM platform integration. They also benefit from a PLM update, versioning, maturity, and an impact graph. The impact graph also applies to simulation objects and their results.

Several mechanism representations for a single product, with their own life cycle
You may define as many Mechanism Representations as you want to for a single product, depending on the combination of engineering connections you select. As different lifecycles between product data (design oriented data flow) and kinematics data (simulation oriented dataflow) are managed, analysts can reuse product design data in several simulation contexts.

**Slider manipulation for interactive check of mechanisms**
You can control the mechanism motion interactively through sliders manipulation of any coupled mechanism commands.

**Drive under-constrained systems**
Designers may define their parts with flexibility as the solver can drive under-constrained mechanisms.

**Simulation creation at any product level**
Simulations can be carried out at any level on the product structure, and not only at the first level of instance under the product which contains the mechanism. Mechanism representations can be directly reused with a sub-product instance context. It makes it possible to simulate in detail the motion of an assembly built up with several occurrences of the same flexible sub-assembly, such as a crankshaft.

**About Dassault Systèmes**
As a world leader in 3D and Product Lifecycle Management (PLM) solutions, Dassault Systèmes brings value to more than 130,000 customers in 80 countries. A pioneer in the 3D software market since 1981, Dassault Systèmes applications provide a 3D vision of the entire lifecycle of products from conception to maintenance to recycling. The Dassault Systèmes portfolio consists of CATIA for designing the virtual product - SolidWorks for 3D mechanical design - DELMIA for virtual production - SIMULIA for virtual testing - ENOVIA for global collaborative lifecycle management, EXALEAD for search-based applications and 3DVIA for online 3D lifelike experiences. For more information, visit http://www.3ds.com.