

AMESim

APPLICATIONS – MOBILE HYDRAULICS



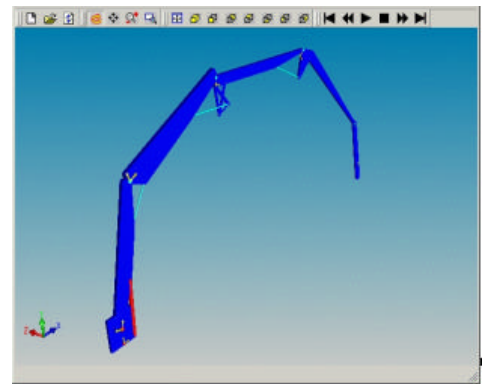
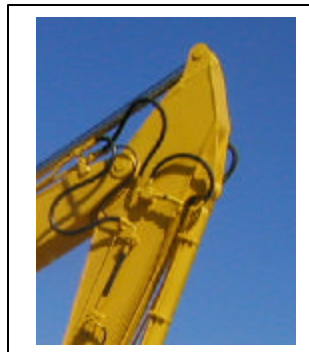
KEY POINTS

- Steady state and transient simulation.
- State-of-the art for mobile hydraulics system modeling.
- Time domain and frequency analysis tool:
 - Vibration modes characterization
 - Eigenvalues and Bode response
 - Activity index for energy/efficiency
- Fluid properties database for a large range of pressures and temperatures.
- Built-in database of parameters for handy modeling.
- Accurate flow considerations (laminar / turbulent).
- Advanced hydraulic line models (wall compliance, frequency dependent friction...).
- Electronic Control Unit integration
- 2D planar mechanisms direct representation.
- Easy integrated comparison with experiments.
- Reduce your costs and enhance your supplier relations by the re-use of secured models.
- AMESim, the simulation environment to improve
 - Functionality & safety (legislation)
 - Performance
 - Efficiency (energy, weight)
 - Dynamic behavior
 - Controllability
 - Customizability

Overview

AMESim® allows you to design and optimize mobile hydraulic systems early in the development process. It offers an open architecture for various configurations (load crane, excavator, forklift, loading truck, side-loader, straddle carrier...)

The dynamic behaviors of such systems are hard to predict since every sub-system needs to be taken into account. For early prototyping, it is efficient to use one simulation environment in which, coupling different modules is possible: enhanced compatibility, reduced implementation time, easy handling of the interface, no programming effort, adapted numerical convergence...



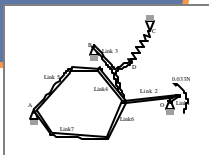
A new step in mobile hydraulic design has been taken by using AMESim, the most efficient tool to answer typical concerns such as sizing of your system, optimization of your network architecture, development of control strategies, increasing component performance, reduction of flow ripples, damping of pressure fluctuations, reduction of energy consumption, increase of efficiency, study of air release or behavior at cold start, analysis of oscillations due to rope effects, understanding of wear and stress due to hydraulic / mechanical couplings, test of different load case situations and working processes... With this new combination of hydraulics & planar mechanics in one physical modeling environment, AMESim provides a speedy, easy, secure & optimal way for the design of mobile hydraulics.

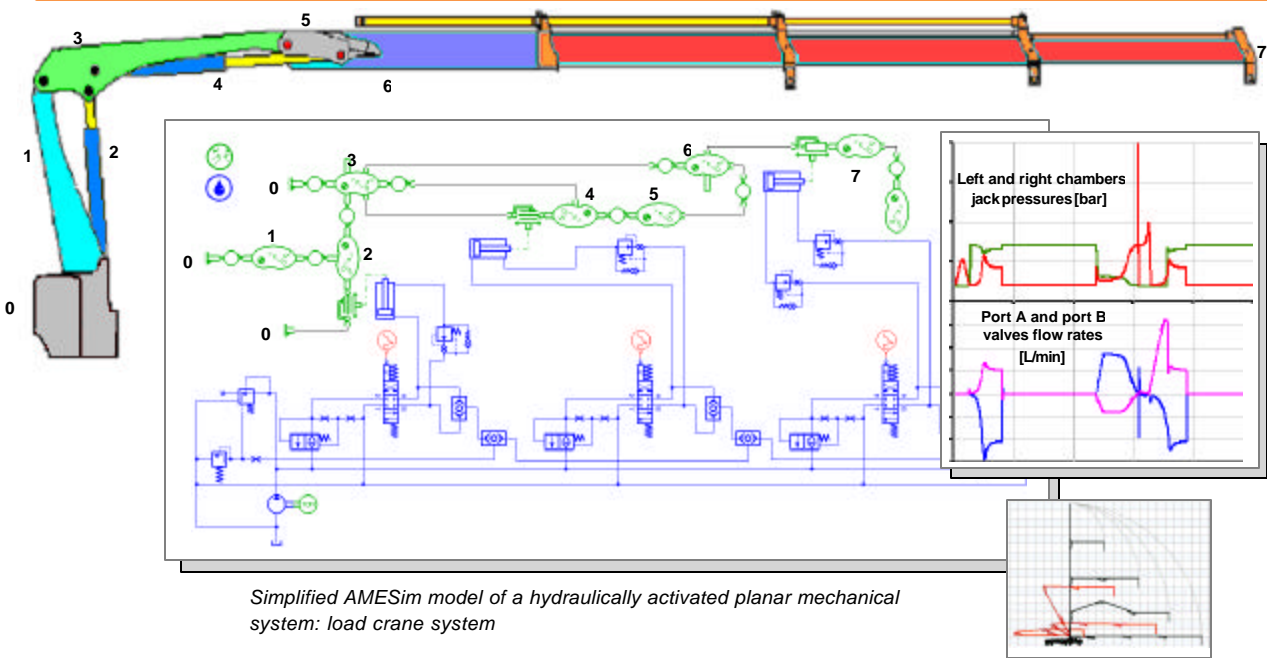
Benefits

AMESim facilitates the development of new concepts and the finding of answers to challenges such as efficient powerful systems or low-maintainability machines.

System development time is reduced significantly (from months to weeks). The maintainability of the models means that the system lifespan is increased while system costs are reduced. Application libraries are constantly evolving thus ensuring that the correct models are always available even in this changing industrial world.

Planar mechanism





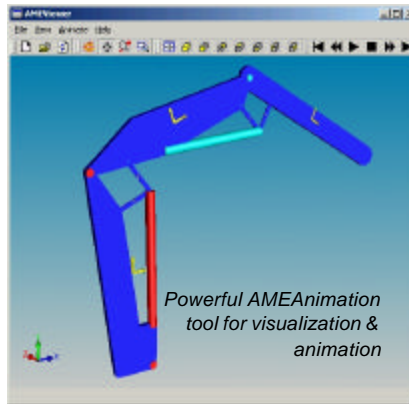
Performance

Models reliability and accuracy are demonstrated through permanent comparison with experimental data for various operating modes, different supply pressures and load considerations.

Simulation results are so predictive that AMESim may be used to control the industrialization process and to determine where to save money with manufacturing considerations by doing model sensitivity analysis.

Applicable libraries

- Standard **AMESim Signal, Control and Observers** library.
- Standard **AMESim Mechanical** library.
- **AMESim Planar Mechanical library** for 2D mechanical systems analysis.
- **AMEAnimation** for 3D visualization and animation
- **AMESim Hydraulic & AMESim Hydraulic Component Design** libraries for liquid components.
- **AMESim Electric Motors & Drives** library for study of electrical parts.



Unrivaled capabilities

Models of multi-domain systems are numerically stiff, extremely non-linear and often modeled with discontinuities. The unrivaled AMESim solver automatically and dynamically selects the most adapted integration method based on the particular system dynamics better than any other software on the market.

Linear analysis allows you to access the system's intrinsic dynamical properties no matter the inputs. The linear model is simpler to analyze than a non-linear model and quicker with almost null CPU time. It is the most powerful tool when excitations are periodic: pump flow ripples, PWM controlled pressure regulator...

3D Visualization

AMESim facilitates the visualization of mobile hydraulics system with AMEAnimation, a 3D visualization tool which automatically generates a CAD-type 3D system from your AMESim model and allows animation of the simulation results.

AMEAnimation is essential for the visualization of vibration as well as for the global understanding of your mobile hydraulics system. Finally, it enables efficient internal and external communication.

References

AMESim is successfully used for the design of mobile hydraulic equipments such as Oil Control, Bosch Rexroth, Casappa, HAWE Hydraulik, HYDAC, Hytos, Innas BV, Poclairn Hydraulics, CIFA, Volvo... AMESim is the preferred solution for the transient and steady-state analysis of mobile hydraulics systems.