

OLEO 1D RAIL

Oleo 1D Rail is a software program that analyses the combined effects of couplers, buffers and anti climbers with approximate crush behaviours of vehicle ends. This is useful for investigating the sensitivity of the whole train Crash Energy Management (CEM) system for collision response. The software is specifically designed for evaluating the options for various energy absorption methods used in bolt on devices including couplers, buffers, anti-climbers and other crush elements.

The software inputs are flexible so that a specific train can be modelled and various collision scenarios simulated.

Longitudinal force, stroke, velocity and acceleration data is output for each vehicle interface.

Each vehicle in the train is modelled as a single mass with a stiffness value.

Each vehicle can be allocated a drive force and a separate coefficient of friction to model brakes or rolling friction.

The hydraulic units are selected from a library of designs that can be customised and their specific dynamic behaviour verified by full size physical testing.

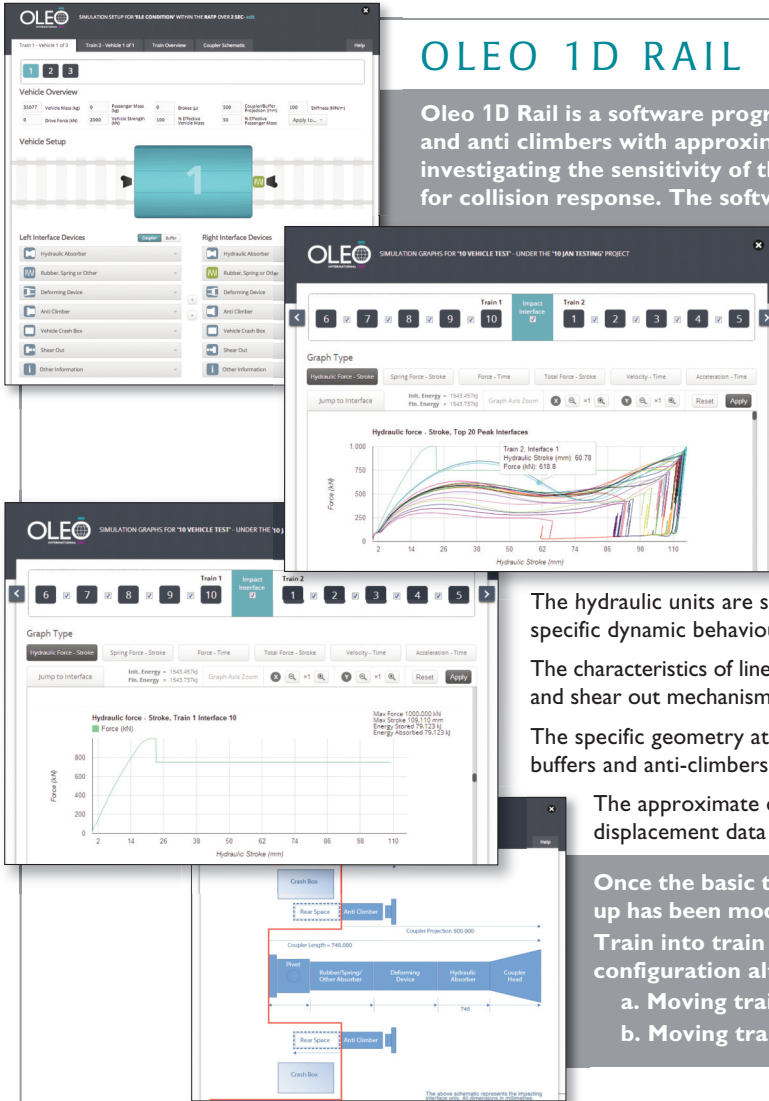
The characteristics of linear devices such as rubber, elastomer, deformation tubes, crush boxes and shear out mechanisms can be selected. Specific alternative characteristics can be entered.

The specific geometry at each interface can be input along with the train to model the couplers, buffers and anti-climbers along with their force stroke characteristics.

The approximate crush behaviour of the ends can be entered as force vs. displacement data from separate detailed finite element analysis.

Once the basic train of up to 100 vehicles and their energy management set up has been modelled, it is possible to run various collision scenarios such as: Train into train – either same configuration or a different train configuration altogether and;

- Moving train into stationary train – with and without brakes.
- Moving trains at different speeds and directions.



OLEO 2D AND MULTI BODY DYNAMICS SIMULATION

Oleo Multi Body Dynamics (MBD) Simulations include a three dimensional model of the rail vehicle including bogie and suspension features as well as coupler, buffer and anti-climber characteristics.

The effect of vertical misalignments at the point of impact can be simulated. Vertical and longitudinal force, displacement, velocity and acceleration data is output, allowing analysis of couplers and anti-climbers at each interface along the train as well as predicting wheel to rail displacement.

FINITE ELEMENT MODELS

Oleo can provide special elements for energy absorption devices such as couplers, buffers and anti-climbers for use with FE codes such as LS-Dyna and Radioss crash.

For more information on simulation and testing please contact us at:

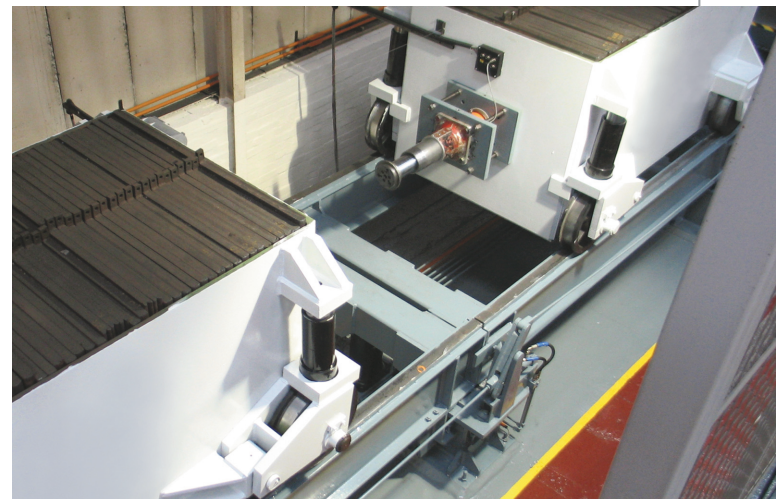
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TEST AND SIMULATION

Oleo has a long history of testing and simulating the performance of its gas hydraulic units for rail and industrial applications. The hydraulic characteristics are non linear and velocity dependent. Oleo has developed proprietary mathematical algorithms for the purpose of simulating buffer performance.

The simulations are matched by a long history of testing full size units to ensure a high degree of correlation.



OLEO的一维碰撞仿真

Oleo 的一维碰撞仿真是一种软件程序，可对耦合器、缓冲器和防爬装置的综合效用进行分析，并能展现车辆终端的近似冲撞状态。这对于分析整列车碰撞能量管理 (CEM) 系统的碰撞响应灵敏度十分有用。该软件专门用来对各种能量吸收方法和使用方案进行评估，包括各类栓接型耦合器、缓冲器、防爬装置和其它碰撞吸能装置。

软件输入灵活，可对具体的列车进行建模，并能模拟各种碰撞情形。

每节车厢的接口可输出的信息有纵向力、行程、速度和加速数据。

列车的每节车厢都可作为单一的质量来建模，都有一个刚度值。

可为每节车厢分配一个驱动力和一个单独的摩擦系数，以建立制动或滚动摩擦模型。

液压装置从设计库内选取，可对其进行客户化设计，并能通过全尺寸物理测试来验证其特定的动态表现。

可以选取橡胶、弹性体、压溃管、冲撞盒、切断机制等线性装置的特性。可以输入特定的可替代特性。

可沿列车输入每一接口处特定的几何形状，为耦合器、缓冲器和防爬装置及其它冲击力行程特性建模。

车辆终端的近似冲撞状态可作为碰撞力输入（对应于获自其它详细的有限元分析的位移数据的碰撞力）。

建立起最多具有 100 节车厢的基本列车及其碰撞能量管理设定的模型之后，便可运行各种碰撞情景，包括以下几种：列车与列车相撞，两列车配置完全相同或完全不同；

- 运行的列车撞向静止的列车（带制动器及不带制动器）。
- 两列运行的列车相撞，速度不同，运行方向也不同。



OLEO的二维及多体动力学碰撞仿真

Oleo 多体动力学 (MBD) 仿真服务包括铁路车辆的三维模型，可展现转向架和悬挂特性以及耦合器、缓冲器和防爬装置的特性。

可以模拟冲击点的垂直偏差效果。输出信息有垂直力、纵向力、位移、速度和加速数据，可对列车每一接口处的耦合器和防爬装置进行分析并可预测轮轨位移。

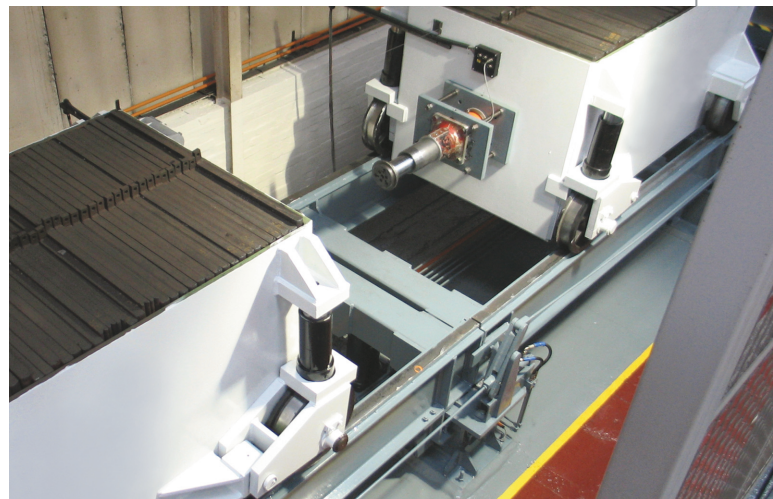
有限元模型

Oleo 可提供用于能量吸收装置的特定单元，例如同 FE 代码（例如 LS-Dyna 和 Radioss 碰撞）一起使用的耦合器、缓冲器和防爬装置。

测试与模拟

Oleo 在测试和模拟我公司为铁路和其它行业提供的气体液压装置的性能方面，有着悠久的历史。液压装置具有非线性特征，其特性还与速度相关。Oleo 开发出专有数学算法，用来模拟缓冲器的性能。

公司的模拟和仿真能力与我们历史悠久的全尺寸装置测试能力相辅相成，确保二者之间高度的相关性。



如需了解更多有关仿真和测试的信息，请与我们联系：

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