



Image © Bombardier

In train collisions there are two distinct objectives to improve passenger safety:

- Elimination of vehicle over-riding or climb over.
- Prevention of uncontrolled structural collapse.

Both are achieved by managing the impact energy absorption and dissipation. Rail vehicles are now designed with controllable deformation characteristics and higher energy absorption characteristics in couplers as well as anti climbing features.

Without anti climbers one vehicle will over ride another in a serious accident. Oleo anti climbers contribute to the 'crash worthiness' of rail vehicles in two ways:

- By absorbing impact energy as collision forces rise following coupler overload. This can be by incorporating a gas hydraulic unit and/or a deforming tube in one or more stages.
- By locking vehicles together during the early part of the collision; controlling vertical movement and helping to direct forces longitudinally.

The anti climber contact faces lock together prior to any vehicle structural deformation and minimise the tendency of vehicles to climb or override.

Oleo were involved in the development of anti climbers working in conjunction with British Rail Research in the 1990s when it was established that end on collisions of railway vehicles presented the greatest hazards to passengers and that most fatalities happened at speeds of less than 60km/h, where successful prevention of over riding and energy management are possible. Extensive full size vehicle impacts were undertaken and the results can be seen in a film entitled „Oleo Crash Energy Management%“.

The Oleo deformation tube has been specifically designed to limit vertical movement even in offset impacts, and promotes a controlled longitudinal stroke. Oleo anti climbers have benefited from extensive dynamic testing as static compression tests do not realistically reflect the performance characteristics during a collision. Oleo recommends that the strength of the engaged anti climbers should be significantly more than 50% of the specified weight of a fully laden vehicle.

These units are customised to meet the geometry and specific parameters of a train and Oleo has implemented many successful projects.

**Oleo anti climbers are available as standard designs or to a specific requirement.**

Anti climber type: **Gas Hydraulic and Deformation**

Crush Force: **700kN**  
Stroke: **600mm**

**Reversible:**  
Stroke 105-5mm

Capacity is greater than 75kJ  
Max buffer force is less than 800kN

**Projection 383mm with buffer heads of 350 x 380mm**



**Non reversible:**  
Total stroke is greater than 300mm  
Capacity is greater than 240kJ  
Buffer force average is less than 800kN

Anti climber type: **Gas Hydraulic and Deformation**

Crush force: **800kN**  
Stroke: **300mm**

**Reversible:**  
Stroke 105-5mm

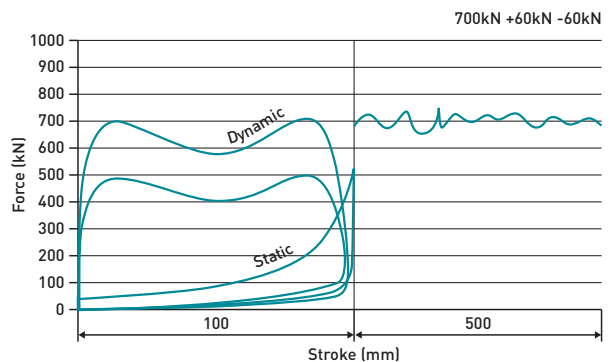
Capacity is greater than 70kJ  
Max buffer force is less than 700kN

**Projection 682mm with buffer head of 350 x 380mm**



**Non reversible:**  
Total stroke is greater than 600mm  
Capacity is greater than 420kJ  
Buffer force is less than 760kN

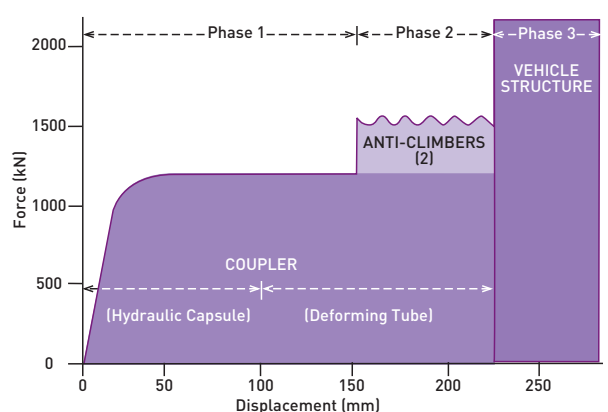
## FORCE STROKE DIAGRAM



Anti climber type: **Anti climber with one shot honeycomb elements**

Crush Force: **150kN**  
Stroke: **75mm**

## TYPICAL ENERGY DIAGRAM



For more information on anti climbers please contact us at:  
Oleo International  
Grovelands, Longford Road, Exhall, Coventry  
United Kingdom CV7 9NE  
E: sales@oleo.co.uk  
T: +44 (0)24 7664 5555  
F: +44 (0)24 7664 5900

Visit our web site at [oleo.co.uk](http://oleo.co.uk)



图片提供单位: © Bombardier

发生列车碰撞事故时, 有两个保护乘客安全的鲜明目标:

- 阻止前后车厢脱轨或上爬。
- 防止无控制的结构坍塌。

两个目标都能通过冲击能量的吸收管理和消减手段得以实现。如今的铁路车辆设计都具有可控的变形特性, 并且钩缓装置具有更高的能量吸收和防爬特性。

如果不设防爬装置, 发生严重碰撞事故时, 便会发生一节车厢攀越骑压到另一节车厢上的。

Oleo 的防爬装置能以两种方式使铁路车辆具有“耐撞性”:

- 随着钩缓装置过载后碰撞力的上升, 吸收碰撞产生的能量。方法是, 在一个或多个阶段装气体液压单元和/或变形管。
- 在碰撞初期将各节车厢锁紧在一起; 控制车辆的垂直运动和纵向分布碰撞力。

防爬装置的接触面会在任何车辆结构变性之前相互锁紧, 从而将车厢攀爬可能性降至最低。

Oleo 早在 20 世纪 90 年代就与英国铁路研究部门一同参与了防爬技术研究与发展。那时候工程和研究人员就确信, 列车尾追碰撞对乘客生命危害最大而且绝大部分恶性事故发生时的车速都在 60 公里以下, 也就是说成功地进行防攀爬预防和碰撞能量管理是可以实现的。工程设计与研究人员对全尺寸车辆作了广泛的冲击力试验, 其结果记录在一个题为“Oleo 碰撞能量管理”的短片里, 可供查看。

Oleo 压溃管设计精良, 能限制车辆的纵向运动 (即便是偏离式冲撞), 使纵向行程得以控。Oleo 防爬装置已接受过广泛的动态测试, 因为静态压缩测试并不能真实地反映碰撞时的性能特点。Oleo 建议, 防爬装置激活后的强度应远远超过满载车辆额定重量的 50%。

这类装置都采用客户化设计, 与客户列车的几何形状和技术参数相符。Oleo 已在许多项目中成功实施了这一技术。

**Oleo 可提供标准型防爬装置, 也可根据客户的具体要求进行量身定制。**

防爬装置类型: 气体液压装置及  
压溃管

冲撞力: **700kN**

行程: **600mm**

可逆型:

行程: 105-5mm

容量大于 75kJ

最大缓冲力小于 800kN

凸出部位: **383mm**, 缓冲头面积: **350 x 380mm**



不可逆型:

总行程大于 300mm

容量大于 240kJ

缓冲力平均小于 800kN

防爬装置类型: 气体液压装置和  
压溃管

冲撞力: **800kN**

行程: **300mm**

可逆型:

行程: 105-5mm

容量大于 70kJ

最大缓冲力小于 700kN

凸出部位: **682mm**, 缓冲头面积: **350 x 380mm**



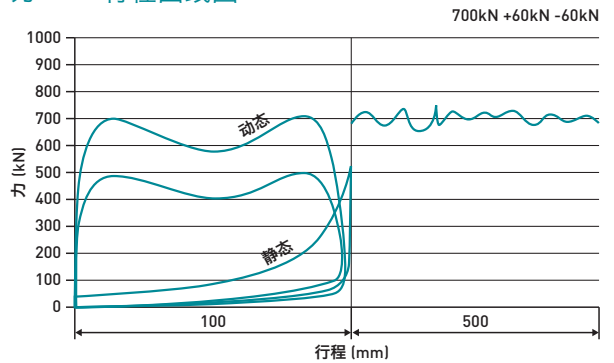
不可逆型:

总行程大于 600mm

容量大于 420kJ

缓冲力小于 760kN

## 力 行程曲线图

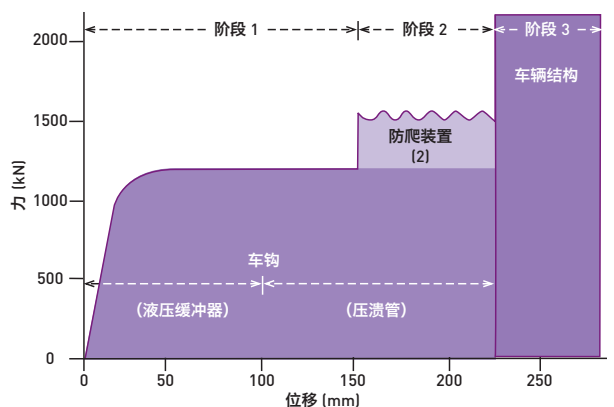


防爬装置类型: 防爬装置, 带一次动作蜂窝元件

冲撞力: **150kN**

行程: **75mm**

## 典型的能量示意图



For more information on anti climbers please contact us at:  
OLEO BUFFERS (SHANGHAI) COMPANY LIMITED  
豪乐奥机械设备 (上海) 有限公司  
Plant A15 Xinfei Garden No 3802 Shengang Road  
Songjiang Shanghai 201612 PRC  
上海市松江区申港路3802号新飞工业园A15厂房 邮编: 201612