



APPENDIX 3 – Table of Contents – Equipment Information



Equipment Information

General Trailer Information

The hydraulic platform trailers were specifically designed to manoeuvre heavy pieces of equipment over public roads. The key feature of the hydraulic platform trailers is their lightweight and excellent load carrying ability. The platform vehicle frame and the cross beams of the trailer are electronically welded structural steel works in a box structure. The result of this design is an especially rigid frame with excellent torsion capacities at a weight significantly less than conventional modular trailers.



Certain axles are provided with hydraulic motors supplied with metered fluid from a power pack pinned to the end of the deck. By driving loaded wheels in the direction they are pointing, excellent traction is ensured within a very compact arrangement. The axles may be rotated in plan to a degree determined by a central computer to allow a variety of movements not possible with conventional trailers making the arrangement extremely manoeuvrable. The deck of the trailers may be raised and lowered using the hydraulic suspension to accept and release the loads. Using the hydraulic suspension, the deck of the trailers can be maintained level.



Construction

The cross beams are welded between the main beam and the swivel bogie beams with end parts. The swivel bogie beams serve for the reception of the running gears. The running gears are swivel mounted to the steering pivots by means of roller bearings.

Axles

Two axles on each line support the structure. Each axle has four tyres i.e. 8 tyres on a line. Between the axles and the structure, a ball rotation track and hydraulic lift cylinder is mounted. Each axle configuration has the possibility to rotate 45 degrees. Ground undulations, cross-falls etc. can be equalized by the reciprocating movements of the axle and the hydraulic lifting cylinders.

The suspension's hydraulic rams guarantee equality of load sharing within an inter-connected group of suspension rams, and the ability to keep the trailer deck horizontal (independent of what wheels are doing) within the stroke of the rams. The suspension rams can be hydraulically connected to form a 3 or 4 point suspension arrangement of separate hydraulic "areas". The proportion of load carried by each "area" is dependent on the location of the centre of gravity on the trailer.

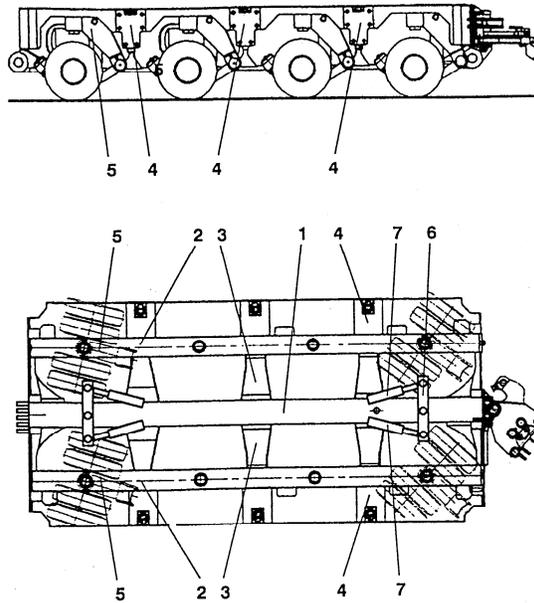
Brakes

Each axle is connected to a pressurized hydraulic spring / service brake system. In case of a loss of "hold off" hydraulic pressure, the internal spring automatically closes the brakes until such time as pressure can be restored. If a unit is at fault, the spring can be mechanically wound off until repair can be mechanically wound off until repair can be affected allowing normal service braking.



Steering

The steering forces are transferred mechanically by means of the steering plates hydraulically by means of the cylinders according to the displacer principle. With the platform vehicles, steering arms, steering linkages and track rods that are connected with the running gears perform the steering transfer of the steering forces.



Frame Components

1. Main Beam with Coupling
2. Swivel Bogie Beams
3. Cross Beams
4. Side End Parts
5. Running Gears
6. Steering Plates
7. Steering Cylinders



Running Gear

The running gear is a swing arm construction with an oscillating axle that turns around the steering pivot, which is mounted to the platform.

The steering head of the bogie runs on the roller bearings of the steering head bearing, which are lubricated via a grease nipple. The swing arm is mounted to the bogie and can turn around the swing arm bearing. The lubrication is carried out by means of two grease nipples provided at the swing arm bearing. The axle runs on bearings on the swing arm in an oscillating and maintenance free way via the steel rubber bush. In such a way, uneven ground conditions will be compensated. The swing arm is supported against the bogie with the help of the support cylinder. The support cylinder is at its upper end mounted to the bogie by means of pivoting bearings and at its lower end cardanic mounted to the swing arm by means of a ball and socket joint, and in such a way as to protect against lateral forces.

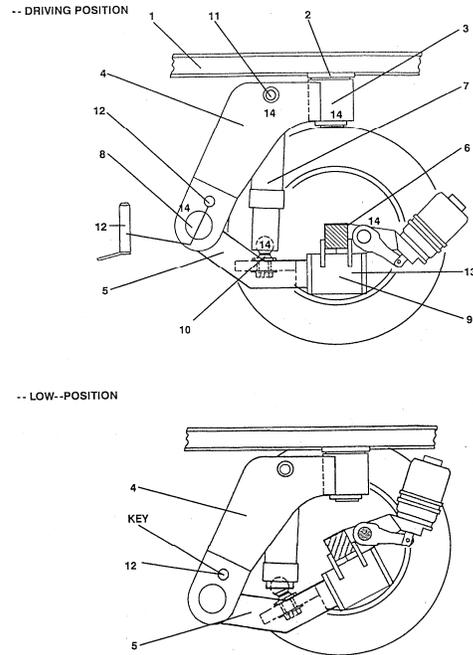
Stability

The objects to transport often are heavy and large and it is important to create optimum stability. To create such stability technical measurements are taken.

The theory behind stability is the following: Always try to create a three-point support. (A chair with three legs has more stability than a chair with four legs). A three-point support can be realised by dividing all wheel bogies into three groups. In each group all wheel bogies are connected hydraulically. The oil can flow unlimited from one wheel bogie to another. Calculations are made to decide how to divide all wheel bogies.

The dangers of overturning can be recognised when the axle load of a running gear group of a loaded vehicle drops below 50 bars. That means that the relevant running gear group is no longer participating in the support. The static support pressure may not exceed 280 bars in any support group. In an ideal case, all the support groups would show the same pressure, where the load centre of gravity is located in the payload centre of the trailers.

The load centre of gravity should always coincide with the payload centre of the trailers. The load centre of gravity can move away from the trailer centre by exterior influences such as dynamic axle load displacement at ascending or descending gradients, in curves or through wind power. If the load centre of gravity moves out of the area formed by the tilt characteristics, the load and trailers will turn over.



Running Gear Components

- (1) Swivel Bogie Beams
- (2) Steering Pivot
- (3) Steering Head
- (4) Bogie
- (5) Swing Arm
- (6) Swivel Axle
- (7) Support Cylinder
- (8) Swing Arm Bearing
- (9) Swivel Bearing
- (10) Ball And Socket Joint
- (11) Pivoting Bearing
- (12) Key With Boring
- (13) Steel-Rubber Bush
- (14) Lubricating Points



Support Types

3-Point Support

In normal driving operation, three-point support should be selected. A three-point support system means that all support cylinders of the running gears within a platform vehicle or combination are divided into three groups.

4-Point Support

In special driving situations (high centre of gravity, coupled bridge etc), a four-point support should be selected. A four-point support system means that all support cylinders of the running gears within a platform vehicle or combination are divided into four groups. In this case of axle distribution, the single groups are statically undetermined and very high frame distortions and axle load displacements may occur.

Windspeed

If an object is large the influence of wind speed on the trailers and object has to be calculated. Wind speed causes extra pressure on certain wheel bogies. A calculation guarantees a safe transport.

Slope

If a road has a slope the stability of the trailers and object changes. With axle compensation it is possible to decrease this slope. If a slope can't be eliminated completely by axle compensation, the new stability point has to be taken into account.

Driving Height

The loaded vehicle may only be operated at a driving height of 1290mm. This is imperative due to the otherwise lacking axle compensation. A lifting range of +325mm (platform height 1595mm) and a lowering height of -325mm (platform height 945mm) will result from the driving height.



Comparison Between Normal Highway Tractor and Prime mover



Typical Highway Tractor	Mammoet Prime Mover
Chassis: Kenworth, Peterbilt, Western Star, etc	Chassis: Kenworth C-500 or T-800, Western Star 4900
Frame: Single Frame Rail Construction	Frame: Double Frame Rail Construction
Engine: 475 – 500hp various makes	Engine: 500hp or 550hp Caterpillar
Transmission: 18 speed	Main Transmission: 18 speed or Caterpillar Automatic
EPA Standards: Noise and emissions system are unmodified stock factory systems	EPA Standards: Noise and emissions system are unmodified stock factory systems
Auxiliary Transmission: N/A	Auxiliary Transmission: 2 or 4 speed Auxiliary
Front Axle: 13,000lbs	Front Axle: 20,000lb
Front Tire Size: 11R x 24.5	Front Tire Size: 425 x R22.5
Rear Ends: 46,000lbs, 4:30 or 4:11 ratio	Rear Axle: 70,000lb Planetary Drive, 6:36 or 7:11 ratio
Tare Weight: 25,000lbs	Tare Weight: 32,500lbs (no counterweight)