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# Lifting Plans

**Fire Service College 2015  
Heavy Rescue Workshop**

# Heavy Vehicle Lifting and Stabilisation

Rescue from road vehicles involved in collisions has long been associated with the Fire and Rescue Service. FRS's across the UK attend these sorts of incidents on a daily basis, rescuing trapped casualties from all types of vehicle on the UK's roads.

Heavy Vehicle Road Traffic Collisions (RTC's) offer many varying challenges to attending emergency responders for a number of reasons, for example:

- Size, Weight and Construction of the Heavy Vehicle (Up to 44 Tons GVW for a normal LGV, Special Types can be 150Tons+)
- Vehicle systems and design, significantly different to light vehicles, (air brakes, air suspension and suspended cabs/ drivers seats etc). Many different vehicle options are available depending of the vehicles intended use.

# Heavy Vehicle Lifting and Stabilisation

- Multitude of loads carried on UK roads, from supermarket foodstuffs to explosives, not only dealing with these loads but getting accurate early information can be problematic.
- Heavy Vehicle incidents may involve Emergency Responders working at height to free trapped drivers, or involved in securing/ removing loads which may have shifted to facilitate a rescue.
- Wider range of rescue equipment required, not only to release or gain access to the trapped occupants, but to perform any required securing, lifting and stabilising actions safely and correctly.
- Forces generated can be significant, Commercial vehicles are restricted by law to 56 MPH for an LGV, 65 MPH for a PSV/ Coach.
- The larger busses and coaches on UK roads can carry up to around 70 people, with the normal coach or bus around 49-52 depending on design, this will ensure high casualty numbers if involved in a significant collision.

# Heavy Vehicle Lifting and Stabilisation

To ensure any Heavy Vehicle incident is satisfactorily concluded Operational Fire and Rescue Service personnel must equip themselves with the knowledge and techniques required.

There are a number of critical interventions which must happen on arrival at a scene to ensure the safety of all attending personnel and casualties. Many of these risk critical steps can be successfully completed without any specialist equipment.

Once these key operations of assessing and managing the vehicles air brake/ air suspension system are complete, the subsequent planning to release entrapment can move forward safely.

# Heavy Vehicle Lifting and Stabilisation

Stabilisation and lifting of a heavy vehicle will require a properly assessed lifting plan to ensure the vehicles chassis/ Axle's are stabilised correctly before, during and after the lifting process. Part of that planning will be to correctly allocate primary and secondary lifting resources to the task in hand.

This planning should ensure all the lifting and stabilisation resources can complete their operation successfully without hampering each other's.

# Heavy Vehicle Lifting and Stabilisation

When FRS's consider equipment options for Heavy Rescue incidents, there is a wide range available from a number of manufacturers, from the more traditional high and low pressure air bags to purpose built hydraulic lifting struts, LGV rated stabilisation shores and rim lifting systems. To complement this state of the art equipment sometimes the most useful items of equipment can be something as simple as a trolley or bottle jack, especially when the lifting requirement is minimal to release the entrapment.

As with any chosen piece of lifting equipment or preferred lifting technique, the key consideration should be its ability to be successfully dynamically stabilised whilst carrying out its operation. Should a chosen lifting technique potentially be difficult to stabilise, the lifting technique and Lifting plan should be revisited.



# Lifting Plans (for all lifts)

- Ensure **parking brake** suitably managed/ applied (Including 1x pair of LGV wheel chocks fitted), (refer to guidance attached)
- Initial static stabilisation/ safety cell (air suspension protection etc)
- Primary lift set up (within equipment capabilities)
- Dynamic stabilisation, Maintains full contact whilst lift in progress.
- Secondary lift/ Plan B, set up as soon as possible/ resources allow
- Static stabilisation, if load suspended for long period (Wood/ blocks)

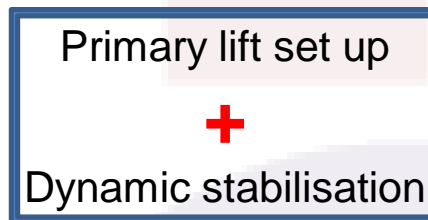


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Ensure air brake  
Management/ wheel chocks

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Initial static stabilisation/ safety cell  
established



- Full lift
- Supported/ partial lift



- Direct Lift
- Indirect Lift  
(Is Axle isolation required)



**Commence lift**

Secondary lift  
(plan B) set up as soon as possible/  
resources allow

Static stabilisation  
(if load to be suspended for a long period)



- Lifting Plan (Direct lift)
- Main lift, Hiab crane
  - Dynamic stabilisation, Paratech VSK
  - Secondary lift, Air bags ( under axle)
  - Static stabilisation if required, wooden sleepers



# Considerations

**Parking brake managed using one of the following techniques (with engine off),**

- Repeated foot valve operation
- Air reservoirs drained
- Red (emergency) suzie line removed (Artic/ drawbar)
- Trailer parking brake applied (Artic/ drawbar)

**Set of LGV wheel chocks fitted,**

- On flat ground, either side of 1x wheel, (non parking brake axle)
- On a gradient, both chocks fitted on down hill side of 2 wheels, (non parking brake axle)
- All the above on a wheel which will not be raised off the ground during lifting.



# Considerations

## **Initial static stabilisation/ “safety cell” established**

- Rigid chassis/ body stabilisation employed ASAP
- Either side of casualty/ casualty vehicle
- Protects against an air suspension failure/ compromise
- Permits personnel to work under an air suspended chassis (SSOW)
- Equipment must be fit for purpose, within SWL/ WLL and set up/ used correctly within the manufacturers recommendations. (including wooden cribbing- purpose built rescue struts/ props).
- Consider additional stabilisation if both sides of LGV or centreline compromised.
- May require additional stabilisation if immediate area to be stabilised is compromised due to access, deformity or corrosion etc.
- Needs to take into account vehicle GVW and any load shift factors.



# Considerations

## Primary/ Main lift

- Can we lift the component trapping the casualty/ casualty vehicle directly (**Direct lift**)? Do we have the lifting capability whilst maintaining full dynamic stabilisation?
- If not can we indirectly lift the component (**indirect lift**) using isolation techniques?, again whilst maintaining full dynamic stabilisation?
- Within the above can we achieve this leaving any road wheels still in contact with the road to help maintain stability and parking brake requirements (**Partial/ Supported lift**)? If possible try to avoid lifting an axle fully off the ground, it will make the lift more unstable and remove braked road wheels from holding the vehicle in place.
- Equipment must be fit for purpose, within SWL/ WLL and set up/ used correctly within the manufacturers recommendations.
- Does the equipment we are choosing have the necessary performance in capacity and height required?



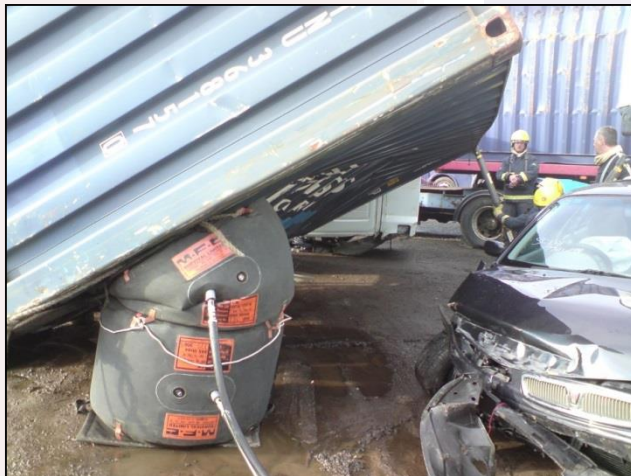
# Considerations

- Is the vehicles construction in the area we are choosing to lift/ stabilise structurally sound and able to take any additional loading?
- When selecting a primary/ main lift, consider dynamic stabilisation at the same time. Certain lifting techniques will be easier to stabilise due to available access or suitable structure. **If the lift cannot be dynamically stabilised correctly the lifting technique chosen must be re-considered**
- When placing lifting equipment, thought should be given to leaving space/ access for dynamic stabilisation and secondary lifting equipment. Inconsiderate equipment placement can restrict or rule out subsequent equipment use.
- Before initiating the lift ensure all connections and stabilisation are checked (final check)



# Considerations

- Monitor closely the lifting phase, ensuring the lifting and stabilisation equipment remain in contact and maintain shape, should any part start to work outside its designed range or specification the lift should be **stopped**, statically stabilised and corrected before continuing.
- High and low pressure air bags due to their construction will change or adapt their shape during lifting operations, sometimes producing a sideways or offset force thus causing additional stabilisation issues.
- Lifting and stabilising struts are designed to operate within certain parameters, should they operate outside that the less of the vehicles applied weight they are able to accept (refer to manufacturers guidance/ best practice)





# Considerations

## Dynamic stabilisation

- **Must** be employed in all lifting operations
- **Must** maintain full contact with the lift/ casualty vehicle and the ground at all times
- Will ensure that should there be an equipment failure or problem with the casualty vehicle, the lifted chassis/ item remains held in place.
- Variety of equipment in the market place from wooden blocks to purpose built struts
- Equipment must be fit for purpose, within SWL/ WLL and set up/ used correctly within the manufacturers recommendations.
- Does the equipment have the same or greater operating range than the lifting equipment, i.e. can it stay in contact throughout?
- When setting up dynamic stabilisation equipment, place a small amount of free play in the system, this will ensure that once the lifting equipment is made-up the operator is able to remove the stabilisation equipment. Suspension settlement can cause a different ride height initially.
- Operators of stabilisation equipment must be able to do so from a safe area, i.e. not under the vehicle.
- Before initiating the lift ensure all connections and stabilisation are checked (final check)
- Ensure the primary lift and dynamic stabilisation phase is properly controlled by suitably qualified personnel.



# Considerations

## Secondary lift

- The purpose of a secondary lift, is to take over from the main/ primary lift should it fail to achieve its objective. This could be because of equipment failure, displacement, lack of capacity or a miscalculation in the setting up phase.
- In this instance the lift would cease and be held by dynamic stabilisation equipment. The secondary lift would then take over/ continue.
- A Secondary lift is set up/ considered as soon as resources and manpower permit, if possible alongside the main/ primary lift set up.
- It may involve supplementing or duplicating the main/ primary lift, or may use a completely different item of equipment and technique.
- This secondary lift must have the ability to be dynamically stabilised, either utilising the current dynamic stabilisation choice, or a different option.
- Experienced crews should allow and consider for secondary lifting in their main/ primary lift planning/ set up.

## Static Stabilisation

- Should the lifted casualty vehicle then be required to be left in the raised position for any period of time, additional static stabilisation should be considered. Not only to make the working environment as safe as possible for personnel working in or around the vicinity, but also to minimise the loading on equipment. Wooden or plastic cribbing is well suited for this task.



Any questions?





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## Further Information

For further information please visit:

- [http://www.ukro.org/CMS/nat2011/UKRO LGV PSV Air Brake System 2011 Firefighter Safety v1.pdf](http://www.ukro.org/CMS/nat2011/UKRO_LGV_PSV_Air_Brake_System_2011_Firefighter_Safety_v1.pdf)
- [http://www.ukro.org/CMS/nat2011/UKRO LGV PSV Air Suspension System 2011 Firefighter Safety v1.pdf](http://www.ukro.org/CMS/nat2011/UKRO_LGV_PSV_Air_Suspension_System_2011_Firefighter_Safety_v1.pdf)
- [http://www.ukro.org/CMS/UKRO LGV PSV Vehicle Stabilisation 2013.pdf](http://www.ukro.org/CMS/UKRO_LGV_PSV_Vehicle_Stabilisation_2013.pdf)
- [http://www.ukro.org/CMS/nat2010/UKRO Heavy Rescue Workshop Hampshire 2010 Lo Res.pdf](http://www.ukro.org/CMS/nat2010/UKRO_Heavy_Rescue_Workshop_Hampshire_2010_Lo_Res.pdf)