UNITED KINGDOM RESCUE ORGANISATION

Heavy Vehicle Construction



ve Webb QFSM, MA, BSc (Hons)



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Chair: Dave Webb QFSM, MA, BSc (Hons)

Heavy Vehicle Construction

Aim

The aim of this session is to familiarise Operational Fire fighters with the latest technology in Heavy vehicle construction and design.



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Heavy Vehicle Construction

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Suspension systems
Operational considerations

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Chassis



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- Made of 8mm-12mm High Tensile steel, channel section.
- Braced via cross members, channel or tubular section
- Provides Linear and torsional strength
- Carries all the main components i.e. gearbox,cab etc
- Can be flexible for differing applications





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Chassis





Committed to improving professional rescue techniques UNITED KINGDOM RESCUE ORGANISATION D Cab Chair: Dave Webb QFSM, MA, BSc (Hons) Normal Steel (heavy panel gauge) 0238 . ICET High Strength Low Alloy Steel (HSLA)

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HSLA Cab Strengthening



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Glass



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•Windscreen laminated construction, held in with rubber seal, or bonded on newer vehicles.

•Side glass toughened, normally held by rubber seal.

•Tankers/ Hazchem will have heavy duty/ reinforced rear glass panel.

•HGV windscreens can be heavy, 80kgs for a modern high roof sleeper cab (glass carrying handles on all RTs).





Cab Suspension

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Control valve (up/ down)

Pump handle (insert)

Cab lock (1st few pumps disengage)

If cab has to be tilted for access, ensure it is propped/ held forward before working underneath.

Cab tilt pump

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Double bunk, hidden objects etc



Night heater controls/ 12/24v socket, cab lights

24v fridge/ storage





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Storage lockers



Cab Interior

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•Air bags not mandatory on new 2009 HGV's.

•Fitted as an optional extra, generally drivers air bag and seat belt pre tensioner plus possible passenger pre tensioner.

SRS Air bags

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Driver's seat

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•Manual drivers weight control (90-150 kg's)

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Driver's seat (Mechanical)



Drivers seat (Air)

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Steering Wheel adjustment

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Safety hook and chains

Slider release handle (manual or air)

Release handle (pull out and forward)

Connects Tractor unit to trailer









(Removing the red emergency line will immediately apply the trailer parking brakes)

Trailer Connections (Suzies)

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- Designed to take full GVW of trailer
- Allows unit to un-couple
- Has a two speed gearbox to allow a full GVW trailer to be raised.

Consider winding down to assist with stabilisation

Gearbox (Push in for low gear, out for high)

Winding handle

Extending legs with rocker feet



Trailer Landing Legs







- Uses air supplied from engine driven compressor, via storage tanks and valves.
- Two circuits, Service (footbrake) and Emergency (Parking brake).
- Coloured yellow (service) and red (Emergency) on trailer connections (Suzie's).

Air Brakes

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Air in, brake

applied





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Service (foot brake) chamber

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- Service brake (Footbrake) operates when air supplied from drivers foot valve acts on a diaphragm contained in the chamber, extending the push rod and applying the service brake (footbrake).
- On release the return spring overcomes the falling chamber pressure, and the diaphragm returns to its off position.

Air Brakes

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- Parking brake chamber provides both the service (foot brake) brake facility and also the mechanical parking brake via a high capacity coil spring contained in the rear of the chamber.
- Operation of the hand brake lever exhausts air pressure holding back the main parking brake spring, applying the parking brake.



Parking brake section

Service brake section

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Parking brake spring



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Parking brake chamber



Brake wound off (released)



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In the event of a loss of air pressure in the braking circuit, the parking brake will apply automatically.

Parking brakes can be released by manually winding off each chamber.

Each parking brake chamber will require individual release via a 24mm or 15/16 inch socket.

The vehicle must be secured/ chocked fully before attempting this, as the vehicles handbrake is completely removed.

Consider specialist advice

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•The parking brake lever (Handbrake) will lock in the ON position.

•To release the parking brakes, the release collar needs to be lifted before the lever can be operated.

Release collar

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Red park button (applies trailer parking brakes)



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•Located mid chassis on trailer

•Black shunt button (allows shunting without air from tractor unit)

Air Brakes System Trailer Brake controls



Heavy Vehicle Construction

Steel Suspension



Heavy Vehicle Construction Rubber Suspension

"Elephants feet"

•Fitted to Double drive bogies, Tippers, Low-Loaders etc

Very robust/heavy construction

•Utilises the natural properties of rubber

•Non adjustable

Air Suspension

Most dominant spring type fitted in commercial vehicle sector

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•Modern Electronic Systems (ECAS) etc

•Reduces vehicles ULW

Reduces driver and vehicle fatigue

•Fully adjustable

•Maintains constant ride height regardless of load

•Requires additional axle location

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Air Reservoirs (System operating pressure up to 10bar)

Levelling valve (constantly measures chassis height)

Air Bag (U Bellow type)

(Air bag internal working pressure 5-8 bar approx)

Air Bag (Folding bellow)







Suspension systems Wabco Air Suspension Components





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•Electronically controlled (ECAS system)

•When traction assist is required will automatically raise.

•Ensure axle is secured via chains, ratchet straps or blocks etc, before working around a raised lift axle.

•Switching off the engine or isolating vehicles batteries may cause the axle to lower.

•Purpose to increase Chair: Dave Webb. QF5M, MA, BSc (Hons) tyre/axle life span and improve fuel economy.

•Lifted electronically by the driver when axle load allows.

•Will lower automatically when axle is loaded.



Suspension systems Lift Axles

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Tractor unit/ Prime mover control pad

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Trailer Control Handle

Suspension systems Wabco Air Suspension Controls









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• Vehicle parking brake.

Rigid vehicles check hand brake lever, drain air tanks via manual drain or foot valve operation, wheel chocks.

Artic/ Draw bar, apply trailer brake or remove red emergency line, wheel chocks.

Cab/ Chassis stabilisation,

Primary via ratchet straps/blocks before casualty carer access.

Secondary via Rescue tender/ Paratech.

Wind down landing legs of trailer to aid chassis stability.

Operational considerations

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- Air bag considered if not deployed, bagbuster etc.
- Driver seat suspension managed using wedge/ air supply disconnection.
- Steering wheel relocated
- Air suspension managed before working beneath chassis.
- Lift axle lowered if possible, or strapped/ chained/ blocked in the raised position before accessing.

Operational considerations





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Any Questions?