HEAVY RESCUE WORKSHOP
UKRO – CARDIFF 2007

LGV HAZARDS & MATERIALS HANDLING

LGV HAZARDS

This workshop will concentrate on LGV hazards, however it should be noted that the considerations provided can be utilised throughout a range of vehicle rescue types e.g.

- Light rescue - cars
- Medium rescue - small buses & vans
- Heavy rescue - trucks & H.G.V.s
- Ultra heavy rescue - buses and trains.

Modern LGVs contain many hazards that rescue personnel need to be aware of when dealing with a vehicle involved in a RTC or fire situation. There are a number of factors that contribute to your considerations when dealing such incidents:

Key design factors:

- Flat front vehicles with small crumple zone
- Composite materials
- Possibly re-enforced
- Diversity in construction.

Vehicle divisions:

- Straight Truck - Rigid (With Trailer)
- Rig - Articulated
- Speciality Truck.

Vehicle knowledge:

Gain vehicle knowledge by attending hauliers, dealerships, courses, workshops etc
Take note of:

- Construction
- Glazing
- Sheet materials
- Engine shut off
- Electrical systems
- Fuel systems
- Brake systems
- Coupling types
- Suspension
- Sleeper cab etc.

Vehicle construction - frames & chassis:

- Normal steel
- High strength Low Alloy
- Micro Alloy Steel
- Boron Steel
- Ultra High Strength Steel
- Ultra Ultra High Strength Steel.

Glazing:

- Bonded
- Possibility of rubber gaskets
- Laminated glass all round
- Insulation (temperature and sound).
- Large screens difficult to manage when removing

Sheet materials:

- Steel
- Fibreglass
- Polyester
- Composites.

Electrical system:

- Large wiring looms concealed in dashboard
- 24v Batteries
- External isolation switches
- 240v inverter for microwave etc.

Fuel system:

- Tanks Contain up to 800 ltrs/350 gal
- Multiple tanks may be fitted
- Connected with shut off valves
- Continental drivers may have large volumes in isolated or hidden tanks
- Consider LNG or CNG may be present

Articulated vehicle brake hose identification:

Red - emergency & trailer brakes
Yellow - service brake
Blue - secondary brakes (3 line system only)

Note that couplings may be self sealing once disconnected. Most modern vehicles have the two line system

Red - emergency and trailer.(permanently charged)
Yellow - service line to trailer (footbrake and secondary position of h/brake valve)

Where both lines are black they will have male couplings and female couplings. The female coupling deals with the emergency and trailer brakes. The male coupling will deal with the service line to the trailer.

Coupling system:

- Fifth wheel
- King pin.

Suspension, three parts:

- Axle to Chassis
- Chassis to cab
- Cab to drivers seat

Sleeper cab location (HGV):

- Possibility of Multiple units - behind or above the driver
- Different entry points
- Different positions.

Sleeping Compartments (PSV)

Department of transport state that sleeper cabs must:

- Be sited between the axles
- Have communications with the driver
- Have two separate access/egress points
  * Usually located beneath the rear stairs.

There are a number of immediate issues when dealing with LGV incidents. LGV & PCV stability can prove difficult due to:

- Height of vehicle chassis above ground
- Suspension
- Floating cabs
- Weight compensating seats
- Decorative bodywork covering chassis.
- Air suspension on chassis and cab may compensate when stability employed

Cab height can be problematic, access may be gained by:

- Scaffold
- Ladder
- Another vehicle, etc.

Commercial Vehicle Seating:

Seats manufactured for Commercial vehicles have been designed with driver comfort in mind, these seats have many features such as:

- Manual or automatic weight compensation
- Heated cushions
- Adjustable Back & Head rests etc.
- A recent development of interest to firefighters, is controls for the damping, inflation/deflation of the seat pneumatics. Once the seat has been "chocked & blocked", the air release control can be used by the rescuers to deflate the seats pneumatics. This action secures the seat from further movement, without the need to burst the seats air support bag .
- On some HGV`s air is automatically dumped from the seats when the ignition is turned off.

Weight controlled seats fall into two categories:

- Mechanical (manual)
- Pneumatic (automatic).

Mechanical:

Manually operated by the driver, by rotating the control to show their body weight. The weight adjuster varies spring tension within the seat. This type of seat poses no problem operationally.

Pneumatic:

Automatic operation. Relies on compressed air supply 90-150psi supplied from either Auxiliary or Braking systems. Has a range of movement Approx. 75mm to 100mm and can be locked in the neutral position by the driver which prevents the automatic operation/adjustment. New vehicles have an air release button on the seat, though the seat needs to be blocked before use.

Operational Procedure:

- Switch off engine
- Chock vehicle wheels
- Locate and drain compressed air reservoirs
- Cut away rubber skirt at base of seat
- Use wooden wedges to secure seat position
- Puncture airbag with knife/screwdriver etc
- Check seat is secure.

Further considerations to create space around the casualty are:

Steering:

- Adjustable height
- Adjustable depth
- Airbag may be fitted
- Large diameter steering wheel.

Steering Wheel Release:

A full range of movement is available. This mechanism can be helpful in effecting an extrication of a casualty. May be used (with extreme care) to release pressure on a trapped driver.

The LGV has some smaller hazards which need consideration. Some to identify are:

AdBlue Fuel Additive

- Ammonia based fuel additive
- AdBlue is not combustible. A weak form of Ammonia which is an irritant. In a fire event consider its impact on the environment.
- Tanks from 25 up to 100 litres
- Used on all modern ECO diesel LGV,s

Interior hazards

- Firearms
- Cooking equipment
- 240volt inverters
- Driver panic alarms for security
- Electrical equipment(TV,s Laptops etc)
- SRS Systems

DEALING WITH LGV INCIDENTS

There are six phases that can be identified when dealing with LGV incidents:

- Scene assessment & safety
- Stabilisation & initial access
- Glass management
- Space creation
- Full access
- Immobilisation & Extrication.

Scene assessment & Safety:

- Type of truck
- Type of construction/load
- Position of truck
- Other vehicles involved
- Shut off engine.
- Type of load (drivers papers/trem-cards etc)
- Extreme care must be taken if trailer rear doors are to be opened where a truck is on its side, rolled etc due to load shifting
- Locate vehicle batteries
- General observations - sleeper cab, fuel type etc.
- Firstly Stabilise any load to ensure crew and casualty safety.
- Secondly secure the vehicle trailer and cab to make a secure base to work from.

Stabilisation & Initial Access:

- Chassis suspension - consider under run protection
- Cab suspension
- Driver seat suspension
- Avoid shifts of loads- weight distribution
- Support structure on the corners
- Consider heavy lifting equipment.
- Use suitable platform to gain access/work from
- Be aware of specific dangers in the cab : Coffee maker, TV, Air-conditioning/heating/ 220v electrics
- Possibility of weapons on European vehicles.

Initial Access:

Whilst considering problems associated with cab height, contact can be made with casualty (for airway management & “C”spine immobilisation) via windows, doors etc. However consideration should be given to accessing the casualty through removal of the cab rear panel. Sometimes glazed, these panels often take only seconds to remove, allowing access for rescuers and a possible extrication path.

Glass Management:

- Bonded laminated screen
- Possible side laminated glazing
- 3 methods of dealing with glass
- PPE.

Space Creation & Full access:

- Displacement of dash board:
- High A-pillar cut
- Low A-pillar cut
- Dashboard cut
- Note strong structures
- Door Removal.
- Roof flap
- Rear panel cut
- Sheet metal removal
- Determine strong points by percussion
- Consider hooligan/dewalt saw.

Immobilisation & Extrication:

- Bridge the height gap
- Recognise the difficulty in patient handling due to height of cab
- Attach to spine board as appropriate
- Utilise available resources

CONSTRUCTION MATERIAL TYPES

With the increase in requirements for cab safety a range of new materials have been developed and are being included in todays vehicles. Most fireservice tools will provide adequate performance when relocating the majority of modern materials but there are a number that warrant special interest.

- Boron Steel
- High Tensile Steel
- Multilayered Composite Screens

Boron Steel

Much has been written about the new range of Advanced High Strength Steel being used in Modern car design. USIBOR-BTR-Boron are all the same grade of steel, just with a different name, depending which country it comes from. It is very strong but light in weight.

This steel will be found in the new Volvo XC90, Saab, BMW E60, Porsche Cayenne, VW Toureg and many other cars. The type of boron steel used on vehicles today has extremely high strength. The boron steel used on Volvo cars has a yield point of about 1,350–1,400 N/mm2 (196,000–203,000 psi). That's about four times stronger than average high-strength steel. In general it is used to provide extra strength in the sill area, B Post, chassis areas, rear cross members and as roll over bars.

It should be noted that when dealing with Boron Steel, it would take substantially more pressure to relocate it. This is due to the heating process that the steel is subjected to when it is formed in production. If cutting of the steel is required, it is recommended that a cutting wheel is used or a plasma arc torch. Hydraulic cutters or reciprocating saws should not be used. Boron steel will remove the teeth on a reciprocating saw blade and spread or break hydraulic cutter blades.

High Tensile Steel

High tensile steel is also used commonly within the door structures of modern vehicles. Side-Impact Door Beams provide protection to the passengers during a side impact and absorb the energy of the impact. High tensile steel is difficult to cut with a reciprocating saw blade or hydraulic cutters. The easiest method is through the use of a cutting wheel with either diamond or composite disks.

Multilayered Composite Screens

This type of windscreen is generally found on train carriages and have significant access issues if they are to be removed. Due to the requirement that they should protect the driver of high-speed trains from bird strikes and vandalism such screens are exceptionally thick. Where such screens are bonded into the carriage a suitable cutting tool will be required to cut through the multi layers of glass and polycarbonate with the bonding resins. Such windows are difficult to cut with a reciprocating saw blade. The easiest method is through the use of a cutting wheel with either diamond disk. Serious consideration should be given to the use of BA as the amount of dust given off when cutting such screens is considerable.