GUJARAT GAS



GGL Lifesavers

2nd Knowledge Sharing Workshop for CGD entities

14th February 2022

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	Saves life from driving accident
	Fundamental rules apply to wide range of hazardous activities
	Prevent damage to power cable, gas pipeline and Collapsing of the trench/pit
	Prevent fall of person or injury from dropped objects
	Avoid injury from uncontrolled or dropped load during lifting operation
	Safe guard from oxygen deficiency or poisonous gas environment
	Prevent injury due to electrocution, electrical flash fire or explosion
	Avoid bursting of gas cylinder, flying objects, gas fire & explosion
	Avoid injury from LNG fire, explosion or cold burn
	Safe guard life from gas fire / explosion

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Internal Investigation Report of On-board Compressed Natural Gas (CNG) cylinder explosion at Mansa, Punjab

Actions to avoid recurrence of Incident:

- Lessons learnt from the incident to be shared amongst CNG station staff & relevant stakeholders.
  - Only trained fillers to be deployed at RO/CNG stations for CNG filling operations
  - Continue practice of verification of on-board cylinder test life validity by checking Metal Plate / RC book / Hydro-test Certificate and maintain record of rejected vehicles refused for CNG filling
  - CNG refueling shall not be done if on-board CNG cylinder is observed spurious / altered / modified
- Raise awareness amongst CNG customers to avoid installation of spurious / modified / altered on-board CNG cylinder
- Communicate to owners/dealers of retail outlets to ensure compliance to safety requirements for safe CNG filling

"Safe delivery of the day, everyday"

Investigation Report of Fatal driving injury case at CNG station, Sapar, Rajkot

8.0 RECOMMENDATIONS

- Before starting reversing of the vehicle, driver must ensure that there is no movement of personnel in the vehicle reversing path.
- For safe reversing, driver must check and control full path during reversing of the vehicle with the help of either
  - Rear viewcamera / sensors (proximity distance alarm signal device) to have warning about personnel movement or obstruction in blind spot while reversing of the vehicle or
  - other person watching & controlling personnel movement in the vehicle reverse path and properly guiding the driver
- During movement of the MCV within CNG station, other traffic at the CNG station is to be stopped and movement of the person has to be restricted / controlled in MCV movement path e.g. use of barricade
- Carry out marking of MCV movement path / area and display warning sign like "Accident prone zone – Stay alert"
- Explore the possibility of installation of rear view camera for the observance of the vehicle reversing path or warning sensor with alarmsystem to warn the driverin case of any personnel coming in the vehicle reversing path
- Entry of Third party persons and trespassers must be restricted at CNG station premises.
- Prepare Awareness module(Dos& Don't) to raise safety awareness of CNG

8. Compressed Natural Gas (CNG) Handling

- Follow "Safe System of Work" Life Saver rules
- Ensure that CNG cylinder is within test life
- Avoid CNG filling if CNG cylinder is suspected to be spurious / altered / damaged
- Ensure CNG cylinder and CNG cascade are firmly secured
- Ensure flame proof integrity of all electrical installations in hazardous areas
- Secure high-pressure hose to avoid swinging action in case of failure
- Control the potential ignition sources (e.g. smoking/ naked flame/ use of phone/ hot work etc.) within CNG handling area
- Control traffic of customer vehicles and movement of passengers/ third party within premises
- Carry out periodic risk assessment of the routes used for CNG transport
- Ensure movement of CNG Transport Vehicle on designated path only at CNG station through use of marking and barricades / cones
- Ensure safe reversing of CNG Transport Vehicle with use of reversing camera, parking sensors / guiding staff
- Ensure safe parking of CNG Transport Vehicle with use of wedge lock and parking brake
- Ensure proper grounding of CNG Transport Vehicle and cascade prior to CNG loading /unloading
- Ensure putting the vehicle ignition key in the filling hose before connecting the couplings to avoid hose pull out incident during CNG loading/unloading operation
- Ensure that no passengers are allowed in the CNG filling area or vehicle movement area
- Ensure that vehicle engine is in switched off condition and driver is outside the vehicle before starting CNG filling
- Use insulation pad / rubber mat to avoid contact of CNG filling hose with battery terminals of the vehicle being filled
- Be alert for any gas smell or abnormal sound before and during CNG filling
- Ensure driver does not start the vehicle before disengagement of CNG filling hose by the filler
- Ensure easy access to Emergency stop switches / shut down buttons

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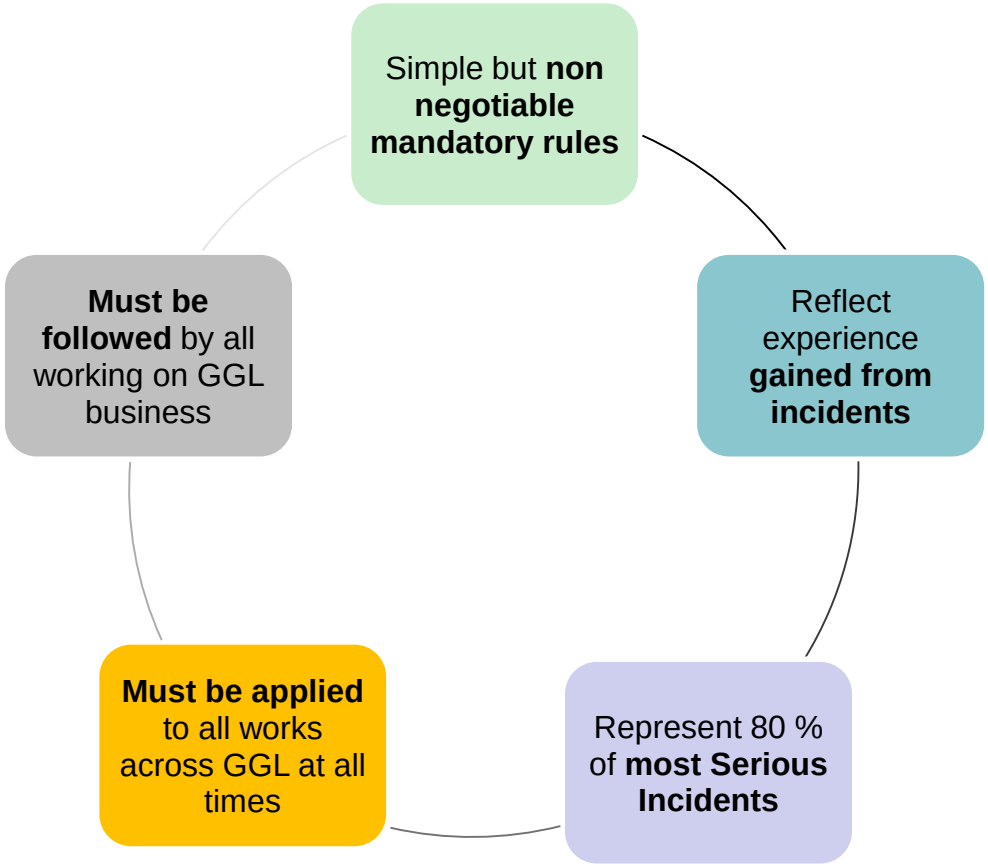
Lifesavers serve **as a real reminder** of the types of activity that**, if not carried out** with the utmost attention to safety, **can result in serious injury or loss of life.**



LIFE SAVERS- FOLLOW LIFE SAVER RULES TO AVOID ACCIDENTS

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1. Driving

- Plan your journey in advance considering route, duration, road condition and weather condition
- Never drive or allow driving when driver is fatigued or under influence of substances like alcohol, painkillers, antihistamines, recreational drugs etc.
- Ensure vehicle is fit for purpose
- Ensure periodic inspection, servicing and maintenance of vehicles
- Ensure provision of leg guards on two wheelers
- Always wear seatbelt while driving / travelling in passenger or commercial vehicle
- Always wear crash helmet while riding two-wheeler
- Never exceed passenger limit in vehicle nor allow unauthorized person in driver's cabin of hazardous goods vehicle
- Avoid use of two-wheeler / three-wheeler for travel on highways and / or dark roads
- Practice defensive driving - Respond promptly to unsafe act of others on the road
- Obey traffic rules, traffic signs and signals
- Obey speed limits
- Avoid harsh braking and harsh acceleration
- Avoid overtaking on the roads without divider
- Drive in correct lane only
- Reduce speed based on road conditions and at accident prone areas like sharp turn, blind turn, steep curve, narrow bridge, heavy traffic area, road under construction, road diversions, etc.
- Maintain safe distance from the vehicle ahead
- Never use mobile phones or any other communication device while driving
- Keep parking lights ON when parking on highway and use reflective parking triangle to avoid accident
- Look for traffic while getting down from vehicle

2. Safe System of Work (SSoW)

- Before commencement of any job, ensure:
  - Job & site related hazards are identified and appropriate control measures are in place
  - An appropriate emergency/ rescue plan is in place
- Obtain Permit to Work (PtW) authorization from issuing authority as applicable to the job
- Ensure that approved PtW mentions detailed scope of work, must have clearly identified hazards, associated risks and necessary control measures
- Ensure no personnel is working at worksite without prior intimation and authorisation
- Avoid Simultaneous Operations (SIMOPS) which have potential to lead to hazardous situations
- Carry out Tool Box Talk (TBT)
- Provide cautionary instructions about exposure to hazards to people in vicinity of worksite
- Prior to commencing a job on isolated facilities, get confirmed all electrical & mechanical isolations (e.g. Gas installation, Gas pipe section, equipment, etc.) by authorised person and follow Lockout & Tag out (LOTO) system
- Ensure the job is performed by trained & competent personnel
- Ensure safety critical job is being supervised by competent supervisor
- Wear appropriate Personal Protective Equipment (PPE) for the concerned job
- Ensure material, tools and equipment required for performing the job are fit for purpose
- If unsure about job to perform safely, stop the job immediately and discuss with supervisor/ manager
- Intervene and stop unsafe job at site
- For any change in conditions, stop work, reassess the risk and obtain reauthorisation as appropriate
- In case of exposure of worksite to road traffic, ensure safety measures like use of flashlight, reflective traffic cones, barricades with reflective stripes to divert the traffic well before the working location / parked vehicle/equipment etc.
- Do not override or bypass any safety controls without proper authorisation and additional safety measures to mitigate the risk
- Before closing & leaving the site, ensure that site is safe, clear & tidy
- Follow Management of Change (MoC) process for changes to plant/ equipment

3. Excavation, Manual Boring and Horizontal Directional Drilling

3.1 Excavation

- Follow "Safe System of Work" Life Saver rules
- Identify, locate and protect all underground utilities e.g. power cable, gas pipeline, etc. as necessary
- Use insulated crow bar / pick-axe for manual excavation
- Identify & mitigate the hazards as necessary e.g. contaminated soil, equipment movement, traffic etc.
- Follow correct trench protection techniques as per soil conditions like step cut (benching) or sloping ("V" shape) or shoring
- Keep machinery and excavated spoil away from edge of trench / pit
- For any change in ground conditions, stop work and consult supervisor
- Keep children away from pit / trench / work sites
- Display warning signs, use appropriate barricades at work area and provide easy means for getting in and out of trench / pit
- Make provision of proper crossover on trench for pedestrian as required

3.2 Manual Boring

- Follow "Safe System of Work" Life Saver rules
- Identify, locate and protect all underground utilities e.g. power cable, gas pipeline, etc. as necessary
- Identify & mitigate the hazards as necessary e.g. contaminated soil, equipment movement, traffic etc.
- Give preference to open cut excavation over manual boring
- Before each manual boring work, ensure:
  - Approved bore plan is in place
  - Entry and exit locations for manual bore are visibly marked
  - Permit to Work (PtW) for the job is in place
- Ensure protection against potential electric shock by:
  - Use of electrical shock resistant (Teflon or equivalent approved insulating material coated) manual boring tool
  - Wearing of rated electric shock resistant hand gloves and shoes
  - Provision of "Electrical Insulating Rubber Mat" on the ground
  - Avoiding work in wet conditions if electrical power supply is not isolated

3.3 Horizontal Directional Drilling (HDD)

- Follow "Safe System of Work" Life Saver rules
- Identify, locate and protect all underground utilities e.g. power cable, gas pipeline, etc. as necessary
- Identify & mitigate the hazards as necessary e.g. contaminated soil, equipment movement, traffic etc.
- **Before starting HDD operation, ensure:**
  - Approved bore plan is in place
  - HDD entry and exit locations are visibly marked
  - Capacity of HDD drilling rig is adequate
  - Proper earthing / grounding of machine
  - Cable strike alarm is in working condition
  - Moving parts of machine are guarded
  - Out rigger of HDD machine is working and rigidly put on stable & firm ground
  - Availability of tracking equipment / device
  - Crane is in good condition
  - Preferably auto rod loading facility is available in the machine
- **During drilling operation, do ensure:**
  - Track movement of the drilling tool is as per approved bore plan
  - Auto greasing & auto loading of machine rod is functioning properly; in case of manual loading of the machine rod, ensure additional safety measures to mitigate the risk from moving parts
  - Entry of unauthorised personnel in the work area is prohibited
  - No maintenance activity is carried out while HDD machine is in operation

4. Work at Height

- Follow "Safe System of Work" Life Saver rules
- Use only approved and certified working at height equipment e.g. rope access system, scaffold, ladder, etc.
- Give preference to safe working platform in place of rope access system or ladder wherever possible for carrying out work at height job
- Ensure use of rope protectors to avoid any damage to ropes from sharp edges
- Identify 'fall from height' hazard before starting of plumbing job (including plumbing at balconies) and ensure use of safety harness with proper anchoring

LIFE SAVERS- FOLLOW LIFE SAVER RULES TO AVOID ACCIDENTS

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- Always use a fall arrestor having:
  - Double action self-locking snap hooks
  - Proper anchor preferably mounted overhead that limits free fall to two meters
- If using a rope access system, ensure use of fall arrest harness
- Select safe routes for installation of Galvanised Iron (GI) riser & lateral
- Never carry out any work at height when near an overhead power line
- Secure all tools and equipment while working at height
- Clearly display warning signs and have the area in control below the workplace wherein "working at height" is in progress
- Stop the work in adverse weather conditions i.e. rain, heavy wind, poor work lights etc.

5. Lifting Operation

- Follow "Safe System of Work" Life Saver rules
- Ensure that approved lift plan is in place having details of lift method, selected lifting equipment, load chart, sketch showing lifting equipment location & orientation, lifting points & centre of gravity and Load movement path, etc.
- Use only correct, approved and certified lifting equipment, tools & tackles and safety devices
- Work according to a lift plan that is discussed, understood and followed by everyone involved in the job
- Do not exceed safe working load limit
- Ensure lifting equipment are working on stable & firm ground
- Ensure safety measures to avoid contact with overhead power line during lifting operation
- Ensure that lift area is fully protected from road traffic vehicles & movement of other equipment
- Prohibit entry of unauthorised personnel and do not allow anyone under the lifted load or in the lift path
- Ensure operator of lifting equipment and signal man are always in contact
- In case of rough weather conditions, stop the lifting operation and wait till condition is normal

6. Confined Space Entry

- Follow "Safe System of Work" Life Saver rules
- Ensure that all isolations are in place
- Check oxygen level inside confined space and if not adequate, do not enter or be inside confined space
- Check with gas detector and ensure there is no flammable gas inside confined space
- Ensure there is no chemical fume inside confined space
- Ensure the person entering the confined space is carrying portable O_2 analyser with provision for low oxygen alarm
- Monitor the confined space atmosphere at defined intervals to ensure safety of person(s) inside the confined space
- Ensure provision of suitable access & egress
- If required, provide Self-contained Breathing Apparatus (SCBA) or forced ventilation
- Always use buddy system, ensure standby personnel is available and is always in contact with the person(s) in the confined space
- Do not allow unauthorised entry inside confined space
- **If rescue needed,**
  - Standby personnel (buddy) to stand outside confined space and call for help of rescue team
  - Allow only authorised rescue team member with all necessary Personnel Protective Equipment (PPE) to enter inside confined space

7. Electrical

- Follow "Safe System of Work" Life Saver rules
- Ensure isolation of all connected power sources, use of Lockout & Tag out (LOTO) before commencement of electrical job and removal of LOTO after reconnecting the power sources
- Ensure that all concerned persons are informed and updated regarding status of isolation
- Consider all conductors are live unless proved dead with a certified testing instrument
- Ensure earthing of all electrical equipment and use of three pin plug and socket
- Never insert open wires in the socket, always use plug & socket
- All electrical work is to be done by certified electrical person and licensed contractor only
- Use portable electrical equipment with double insulation protection
- Ensure protective devices like ELCB / RCCB are used and in working conditions
- Verify equipment and materials being used are of rated capacity
- Ensure use of appropriate PPE like certified insulated gloves etc.
- Prohibit entry of unauthorised person inside electrical installation area
- Do not use damaged electrical equipment

8. Compressed Natural Gas (CNG) Handling

- Follow "Safe System of Work" Life Saver rules
- Ensure that CNG cylinder is within test life
- Avoid CNG filling if CNG cylinder is suspected to be spurious / altered / damaged
- Ensure CNG cylinder and CNG cascade are firmly secured
- Ensure flame proof integrity of all electrical installations in hazardous areas
- Secure high-pressure hose to avoid swinging action in case of failure
- Control the potential ignition sources (e.g. smoking/ naked flame/ use of phone/ hot work etc.) within CNG handling area
- Control traffic of customer vehicles and movement of passengers/ third party within premises
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- Ensure that vehicle engine is in switched off condition and driver is outside the vehicle before starting CNG filling
- Use insulation pad / rubber mat to avoid contact of CNG filling hose with battery terminals of the vehicle being filled
- Be alert for any gas smell or abnormal sound before and during CNG filling
- Ensure driver does not start the vehicle before disengagement of CNG filling hose by the filler
- Ensure easy access to Emergency stop switches / shut down buttons

9. Liquefied Natural Gas (LNG) Handling

- Follow "Safe System of Work" Life Saver rules
- Follow safety procedure for LNG loading/unloading operations
- Use only non-sparking tools while handling LNG
- Control the potential ignition sources (e.g. smoking/ naked flame/ use of phone/ hot work etc.) within LNG handling area
- Ensure proper grounding of LNG transfer assembly & LNG tanker prior to LNG loading /unloading
- Avoid direct contact with LNG (cryogenic) liquid or vapour
- Wear appropriate PPE (cryogenic gloves, cryogenic suit/apron, face shield, helmet, Safety shoes)
- After LNG loading /unloading is completed, ensure disconnection of hose pipe from LNG tanker
- Do not pour water on LNG spillage or leakage point
- Ensure easy access to Emergency stop switches / shut down buttons

10. Gas Escape Handling

- Follow "Safe System of Work" Life Saver rules
- In case of gas escape inside premises, open doors & windows to ventilate the escaped gas
- Give priority to protecting life
- Always wear appropriate PPE including fire retardant clothing
- Isolate/ turn off gas supply as early as possible
- Check for presence of Gas with gas detector, identify gas affected area and if required, evacuate persons to a safe place
- Continuously monitor for presence of gas in atmosphere
- Control the potential ignition sources within Gas affected area/ zone e.g. Do not permit smoking/ naked flame/ use of phone/ operation of electrical switches, hot work etc.
- Cordon leak affected area and display warning signs
- Seek help of local authorities as required to keep traffic & people away
- Seek help of fire department and ambulance services as required
- Post leak repair, carry out leak check to ensure soundness of repaired leak as well as ensure there is no other gas leakage in the area

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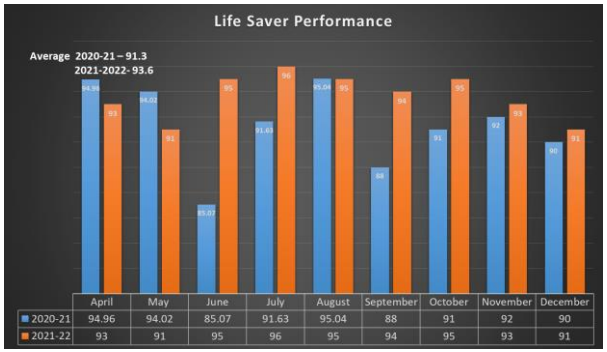
- Part of Safety induction & Basic safety training modules
- Covered in Permit to Work system
- Compliance monitoring through Site inspection checklist
- One of the key safety performance indicators
- Translated and shared in local languages
- Shared through pocket books, posters, GGL intranet, campaigns etc.



Issuing Authority	As per PtW Matrix		
Applicable Life Saver (Select & Tick mark)	Safe System of Work ☐	Working at Height ☐	Lifting Operations ☐
		Gas Escape handling ☐	Electrical Work ☐
	Excavation/Manual Boring/HDD ☐	Confined Space entry ☐	Driving ☐
		CNG Handling ☐	LNG Handling ☐
Other jobs /plan having impact on this job?		Yes / No (If Yes Please mention):	
Mandatory Documents to be attached with PtW/WA request			

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- Serious injuries and fatalities can be prevented across CGD industry in India by implementation of standardized Life saving rules
- For the benefit of CGD industry in India, it is suggested to have Standardization of Life saving rules for CGD industry in India.
- Standardization of life saving rules can be a step toward consistency in implementation of Lifesaver rules by CGD entities and their contractors / service providers.

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Thank You