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## Measures to prevent Vehicle Inundation / Engine Seizure in vehicles during monsoon

### Overview

Most of the metro cities in India lack proper storm water drainage system and with the fast paced urbanization coupled with lack of proper planning, the issue of water logging in the cities is on the rise. The cases of flooding / inundation have become common problem in the cities, which in turn cause flooding in vehicles and hydrostatic locks.

We at Liberty Videocon General Insurance value the safety of your vehicle and intend to suggest some precautionary measures to avoid losses from vehicle inundation. We sincerely hope that the safety measures suggested in this document will help prevent Vehicle Inundation, Hydrostatic Lock / Engine Seizure, and keep you and your vehicles safe.



Source: <http://www.deccanchronicle.com/130610/news-current-affairs/gallery/rain-showers-mumbai>

### Inundation / Hydrostatic Lock

#### What is Hydrostatic Lock / Engine Seizure?

Hydrostatic lock / Engine Seizure happens inside the engine when water enters the engine through air filter, snorkel or the resonator, which is normally mounted near the bumper grille. The placement of the snorkel / air filter / resonator can vary from manufacturer to manufacturer, but it is usually placed in front of the vehicle near the bumper for better combustion for more power and mileage.

In case of hydrostatic lock / engine seizure, water is sucked through the snorkel and sent inside the engine at very high speed, causing engine seizure due to which the internal components of the engine like the connecting rod, pistons, crankshaft, cylinder block, valves get damaged.

The RPM (Revolution Per Minute) of the engine plays a very important role in hydrostatic lock. Normally, when a driver tries to enter the water logged area, he will accelerate, increasing the RPM of the engine, thereby increasing its suction capacity and as a result more water is sucked in at a higher speed.

### Scenarios of Hydrostatic Lock / Engine Seizure

#### 1. Water Splashing

The splashing of water by cars during rains can cause hydrostatic lock / engine seizure if the air filters or the snorkel or the resonator comes in contact with the water. The hydrostatic lock / engine seizure can occur to the car which is splashing the water or to the other car on whom the water gets splashed.

#### 2. Waves in water by other car

Whenever a car is going through water logged area it creates a wave. These waves become bigger as more cars keep passing by, displacing volume of water equal to weight of the cars (as per Archimedes principal). These waves hit the vehicles and the vehicle which has lower air filter or the snorkel or resonator

height, will have the hydrostatic lock / engine seizure.

#### 3. Trying to start the car when flooded

Whenever the car is flooded there is water in the air filter or snorkel and any attempt to start the car results in hydrostatic lock.

#### 4. Height of Water / Vehicle

The height of water through which the driver of the car feels he can get through, is likely to cause hydrostatic lock / engine seizure. The ground clearance, the height of the wheels from the ground and the placement of the air filter or snorkel or resonator together play a critical role when it comes to hydrostatic lock / engine seizure.

## Precautions to be taken to prevent the occurrence of hydrostatic lock / engine seizure in vehicles during monsoon:

### Dos

- Always get the pre-monsoon check done for your vehicle before onset of monsoon.
- Get your vehicle serviced before monsoon starts.
- Get the battery checked, the terminal tightened and apply petroleum jelly to terminals so that the leads of the battery are tight and there is no loss contact to reduce the starting and electrical problems.
- Get the wiper blades changed before monsoon arrives. 
- Keep more than adequate fuel in the vehicle.
- Keep checking the tyre pressure at regular intervals.
- Keep the additional tyre ready for use.
- Keep your medication ready in the vehicle glove box in case of emergency, if you are diabetic / BP / heart / renal patient, so that you don't have to skip your medicines inside the car.
- Keep the vehicle stacked with biscuits, cookies, nuts and some canned juices / drinks and 2 bottles of drinking water. This will help in case you are stranded in a flooded area.
- Keep an umbrella / rain coat in the car, just in case you need to leave the car and walk. 
- Keep a pillow and a bed sheet in the car in case you need to keep yourself warm and need to rest.
- Keep a torch light with additional batteries, first aid box and a small hammer.
- Keep a nylon rope at least 8 meters long and half inch thick in the car dicky, just in case you need it to hold on to the car or help other vehicle tow or help some stranded people.
- When raining keep the flasher on.
- When entering water logged area get windows down by at least an inch to allow fresh air circulation so that you can breathe in case your car is flooded till you escape from the vehicle.
- In case of sudden flooding, if the windows cannot be brought down as the electrical circuits are not working, break open the window glass with the

hammer from the glove box as it is tempered glass and breaks easily than the front windshield.

- Always save fuel by not using the AC when raining.
- Keep the radio on to get information on the water logged areas and try to avoid such areas by using GPS or your knowledge of the area. 
- Keep a mobile charger in the car and keep your mobile always charged.
- Disconnect the charger only when you need to get out of the car.
- Keep your loved ones posted about your status and inform them not to panic and not to call you till a specified time so that you save the mobile battery.
- Always keep ICE (in case of emergency numbers) saved in your mobile.

### Don'ts

- Whenever you see a water logged area try to remember the geography of that area and try to understand why the water is logged. If you are unsure of the geography of that area do not enter the water logging even if it is less than 1 feet as you never know when the depth of water might increase. 
- Never follow any big vehicle while entering a water logged area as the water displaced by it will enter your vehicle.
- If vehicles are splashing water in some water logged area try to avoid that area. If you must go then try another route, else move at the end of the road which has lowest water.
- Don't assume that if a certain vehicle can get through water logging then your vehicle also can. Try to remember and visualise about the air filter / snorkel placement in your vehicle.
- If your vehicle stops in a water logged area do not start the vehicle. Call the help line of the garage to help you and inform the insurance company too.
- If your vehicle is parked and it is flooded with water never start the vehicle. Call the garage to inform that

the vehicle is flooded and ensure that the vehicle is towed to the garage without starting and also inform the insurance company.

- If the vehicle is flooded in the basement of an apartment then do not start the vehicle. Call the garage and remove the battery terminals as soon as possible. Inform the insurance company and with their permission remove the water and dirt from the car to reduce losses. 
- Do not enter water logged area.
- In case your vehicle is an Automatic Transmission (AT) ensure that the vehicle is towed on a flat bed or in case it is not available then the front wheels or the driving wheels need to be lifted off the ground. If this is not done your AT gear box will get damaged. 

**To ensure maximum safety for your vehicle from the occurrence of hydrostatic lock / engine seizure during the monsoon season, all the mentioned safety measures need to be ideally followed.**

### Statistics showing number and types of vehicular damage during the 26/07/2005 floods in Mumbai

Vehicle	No. Damaged
Local Trains	52
Auto Rickshaws	37,000
Taxis	4,000
BEST Buses	900
Trucks & Tempos	10,000
Cars & Two Wheelers	30,000

Source: Municipal Corporation of Greater Mumbai, Disaster Management Cell

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