PEACOCK GROUP SAFETY MEETING

PHYSICAL LAWS OF DRIVING

As a driver you are supposed to know the laws governing the safe and legal operation of your vehicle. By failing to obey State and Federal laws you can have your licensed suspend, receive fines, and maybe be put in jail. It is also important to understand the physical laws which govern the operation of a vehicle. By ignoring these physical laws, you may lose a lot more than your drivers license or some folding money.

Centrifugal force is one of these physical laws. As a child, you may have demonstrated it by holding a bucket half full of water by the handle and whirling it around you. Even with the bucket upside down for a few moments the water stayed in the bucket - just as long as you swung the bucket fast enough.

When you drive around the curve of a road, this same force is at work. Like the water in the bucket, your vehicle hugs the outside of the curve. The centrifugal force is trying to pull your vehicle away from the apex (or inside) of the curve. This force is so strong that sometimes vehicles do drive off the road in corners because of this centrifugal force.

Some modern highways have banked curves to compensate for the centrifugal force of cars going around them. When you come to an ordinary curve that is not banked you have to reduce your speed to stay on the road. The sharper the curve, the slower you must go. As you round the curve, your tires must grip the surface strongly enough to overco me the centrifugal force. This means that both the road surface and your tires must be in good shape for your vehicle to hold the road properly. Any foreign substances such as water, ice, gravel or oil will reduce the grip needed to hold the road and overcome the pull of centrifugal force. Roads with crowns it he middle add to the danger. (Crowns or peaks in the middle of a lane allows for water to run off to each side, away from the center of the lane.)

Friction or gripping power is another natural force that greatly influenced the behavior of your vehicle. In a passenger cars and light trucks there are only four contact points with the road. The actual contact point is actually quite small. Each contact point is a little smaller than the size of the sole of your shoe. Water, mud, gravel and sand - not to mention ice and snow all reduce the grip of your tires to the road.

Brakes are gripping devices that create friction. They turn the energy of the turning wheels into heat. Friction between the brake shoes and the drums stops the wheels, and the friction between the tires and the road pushes against the car's forward momentum slows and stops the vehicle.

Skids are caused by lack of friction. If there is almost no friction on the road (such as ice on the road) will cause your vehicle to skid in any direction. Other causes of reduced friction can be foreign objects on the road (ice, water, gravel) or excess speed or attempting to apply too much braking. The centrifugal force caused by cornering can cause sideslip. Sideslip is where the tires loose adhesion (friction) and begin to slide sideways. While corning, the weight of the vehicle is
shifted to the outside tires causing a greater likelihood of a skid because of the additional pressure applied to these tires. Braking, or accelerating while in a corner adds to the stress of these outside tires adding yet another stress which can cause a skid.

There are several things you can do to work with these natural laws of physics. 1: Brake prior to corners 2: Accelerate after exiting corners 3: Make sure tire pressures are equal all around 4: Make sure brakes are properly adjusted 5: Drive slower on surfaces with foreign material (oil, gravel, water, snow, ice) 6: Apply braking slowly and evenly. Don't put yourself in a situation which requires "emergency" braking.

The St Paul

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PEACOCK GROUP SAFETY MEETING continued

Gravity is another force of nature that helps hold your vehicle on the road. Gravity is important to us as it affects how our vehicles operate on hills. When driving down a slight downgrade, just releasing pressure on the accelerator may be enough to take you down safely. On moderately steep grades, you may have to help the braking action of the engine by applying some brakes. If you find yourself using the brakes much at all on a hill, (a steep downgrade) you should probably be in a lower gear to take full advantage of the braking power of the engine. Downshift to a lower gear prior to the downgrade. If at all possible use the same gear going uphill as downhill. It is often difficult to downshift as the vehicle is traveling on a downgrade.

Accidents on hills are often caused by the driver being in too high a gear, and overusing the brakes. As the brakes start overheating the driver will attempt to downshift the vehicle. Often the vehicle is traveling too quickly to effectively down shift, and the driver misses the downshift, as the vehicle picks up speed now that it is in neutral. The vehicle now has overheated brakes and can not be put into any gear. In example, a fumigation truck in encountered this problem and when it was all over the truck had taken out two trees, driven through a cinder block wall and stopped after crashing partially through a second cinder block wall. Fortunately both people in the truck lived, but it took several hours to cut the driver and passenger out of the truck.

Modern vehicles can go up and over steep hills at reasonably high speeds, but it is best to slow down. There may be a vehicle ahead in your lane, just over the crest of the hill which is moving slower than you. If you do not see this slow vehicle in time, you can get on top of this vehicle without enough distance to avoid a collision. Watch your temperature gauge; if you are climbing a long grade the temperature will rise if you use too high a gear.

The force of impacts is another physical law you should be knowledgeable about. It is sometimes hard to picture the force with which a moving vehicle will make if it hits an immovable object. Here are some examples to help you visualize the force of impact at several speeds.

20 miles an hour equals the force of falling 13.5 feet. 40 miles an hour equals the force of falling 54 feet 60 miles an hour equals the force of falling 121.5 feet

Have you ever jumped of a high dive at a swimming pool? Usually high dives are 10 feet above the water. So imagine raising the diving board to 13.5 feet, then 54 feet then finally 121.5 feet and jumping off, not into water but into the dashboard of your vehicle! Even if you are wearing a seatbelt, the force of impact will still be enough to cause injuries. In a recent study looking at impacts of 30 miles per hour in 1995 Sport Utility Vehicles demonstrated that in most makes and models serious injuries could occur, despite the use of seatbelts and airbags!

Speed multiples the effects of physical laws. The faster a vehicle travels, the more centrifugal forceyou have to overcome in going around a curve, and the less friction you have to help you stay on the road. When you add speed to the pull of gravity down hill, the greater the force of impact will be if you hit a stationary or moving object. Respect these physical laws and make sure you work within these physical laws to avoid accidents.

CORRECTION

Last month there was a typo in the PCOC Mission Statment. The word "through" was mistakenly written as "thorough". The corrected Mission Statement below has the correct word "through".

PCOC MISSION STATMENT

Our Mission is to be the premier state trade organization. We will accomplish this goal by providing the finest services and support to our membership *through* training and education, legislative involvement, and by building industry awareness. These services will provide the opportunity for our member companies to grow and prosper while being environmentally, socially and culturally responsible.