93

BRAKING SYSTEM PRINCIPLES

Figure 93-1 Energy which is the ability to perform work exists in many forms.

Figure 93-2 Kinetic energy increases in direct proportion to the weight of the vehicle.

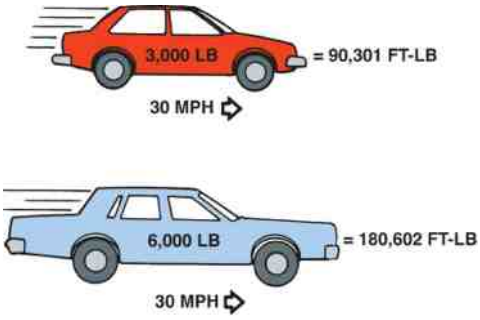


Figure 93-3 Kinetic energy increases as the square of any increase in vehicle speed.

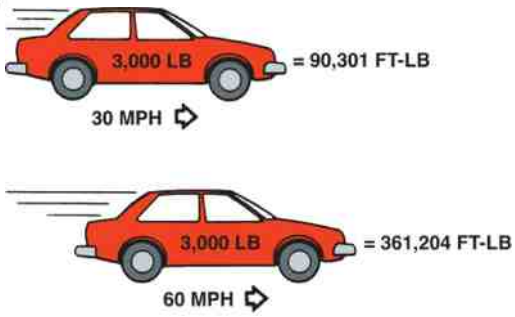


Figure 93-4 Inertia creates weight transfer that requires the front brakes to provide most of the braking force.

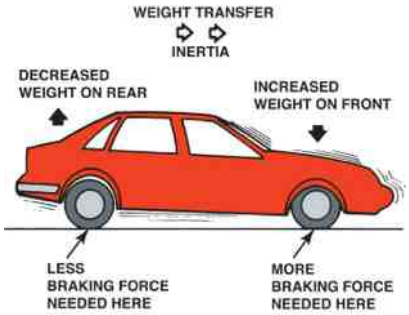
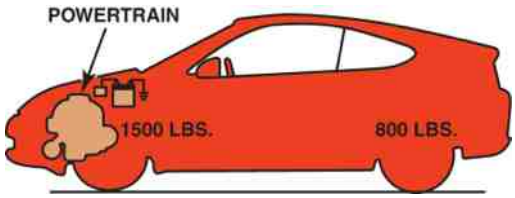


Figure 93-5 Front wheel drive vehicles have most of their weight over the front wheels.



TECH TIP

Brakes Cannot Overcome the Laws of Physics

No vehicle can stop on a dime. The energy required to slow or stop a vehicle must be absorbed by the braking system. All drivers should be aware of this fact and drive at a reasonable speed for the road and traffic conditions.

Figure 93-6 A brake pedal assembly is a second-class lever design that provides a 5 to 1 mechanical advantage.

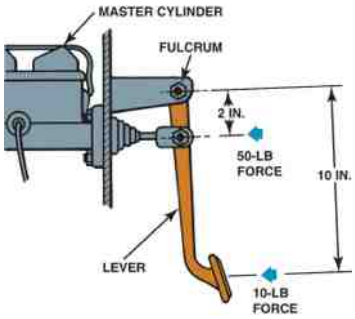


Figure 93-7 The coefficient of friction in this example is 0.5.

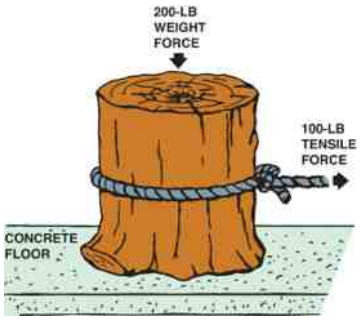


Figure 93-8 The type of friction material affects the coefficient of friction which is just 0.05 in this example.

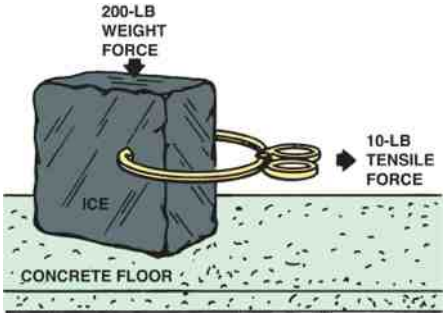


Figure 93-9 The static coefficient of friction of an object at rest is higher than the kinetic (dynamic) friction coefficient once in motion.

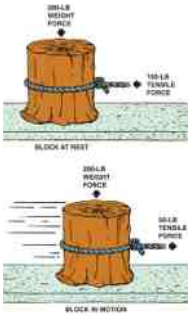


CHART 93–1 The static coefficient of friction of an object at rest is higher than the kinetic (dynamic) friction coefficient once in motion.

CONTACTING SURFACES	COEFFICIENT OF FRICTION STATIC	COEFFICIENT OF FRICTION KINETIC
STEEL ON STEEL (DRY)	0.6	0.4
STEEL ON STEEL (GREASY)	0.1	0.05
TEFLON ON STEEL	0.04	0.04
BRASS ON STEEL (DRY)	0.5	0.4
BRAKE LINING ON CAST IRON	0.4	0.3
RUBBER TIRES		
ON SMOOTH PAVEMENT (DRY)	0.9	0.8
METAL ON ICE	–	0.02

CHART 93–1