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Traction, traction force or tractive force is a force used to generate motion between a body and a tangential surface, through the use of either dry friction or shear force.[1][2][3][4]It has important applications in vehicles, as in tractive effort.

Traction can also refer to the maximum tractive force between a body and a surface, as limited by available friction; when this is the case, traction is often expressed as the ratio of the maximum tractive force to the normal force and is termed the coefficient of traction (similar to coefficient of friction). It is the force which makes an object move over the surface by overcoming all the resisting forces like friction, normal loads(load acting on the tiers in negative "Z" axis), air resistance, rolling resistance, etc.

a physical process in which a tangential force is transmitted across an interface between two bodies through dry friction or an intervening fluid film resulting in motion, stoppage or the transmission of power.

The coefficient of traction is defined as the usable force for traction divided by the weight on the running gear (wheels, tracks etc.)[6][7] i.e.:   usable traction = coefficient of traction x normal force.

In the design of wheeled or tracked vehicles, high traction between wheel and ground is more desirable than low traction, as it allows for higher acceleration (including cornering and braking) without wheel slippage. One notable exception is in the motorsport technique of drifting, in which rear-wheel traction is purposely lost during high speed cornering.

Other designs dramatically increase surface area to provide more traction than wheels can, for example in continuous track and half-track vehicles.[citation needed] A tank or similar tracked vehicle uses tracks to reduce the pressure on the areas of contact. A 70-ton M1A2 would sink to the point of high centering if it used round tires. The tracks spread the 70 tons over a much larger area of contact than tires would and allow the tank to travel over much softer land.

In some applications, there is a complicated set of trade-offs in choosing materials. For example, soft rubbers often provide better traction but also wear faster and have higher losses when flexed--thus reducing efficiency. Choices in material selection may have a dramatic effect. For example: tires used for track racing cars may have a life of 200 km, while those used on heavy trucks may have a life approaching 100,000 km. The truck tires have less traction and also thicker rubber.

The traction of trucks, agricultural tractors, wheeled military vehicles, etc. when driving on soft and/or slippery ground has been found to improve significantly by use of Tire Pressure Control Systems (TPCS). A

TPCS makes it possible to reduce and later restore the tire pressure during continuous vehicle operation. Increasing traction by use of a TPCS also reduces tire wear and ride vibration.[9]

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Traction is an important force to motor vehicles. Tires, usually made of rubber, depend on traction to move a vehicle forward.[2] In manual transmission cars and trucks, a clutch is a friction device that connects the engine to the drivetrain of the vehicle. To work properly, the clutch must have traction.

In railway engineering, the term tractive effort describes the pulling or pushing capability of a locomotive. The published tractive force value for any vehicle may be theoretical—that is, calculated from known or implied mechanical properties—or obtained via testing under controlled conditions. The discussion herein covers the term"s usage in mechanical applications in which the final stage of the power transmission system is one or more wheels in frictional contact with a railroad track.