STREAMLINE BODY DEFINED; TORPEDO AND FISH EXAMPLES

Many Motorists Ignorant as to True Stream-line Design and its Relative Importance to the Operation of a Motor Car.

The term streamline has become such a synonym for the present day automobile body that if a man in the street were asked what a streamline body is he would point to the first modern car that passed and say: "There you are; that's what a streamline body is." The streamline as applied to an automobile body is more than an actuality.

For the high racing speeds the body shape plays an important part, and so, in fact, does every part of the car that has to be forced against the wind. Nearly everyone knows that the larger the frontal area of a surface going straight against the wind the harder it is to propel it. For instance, in walking against the wind on a very stormy day it is as much as you can do to press ahead, and when a very bad gust comes you are apt to stand sideways and then the force against you is considerably lessened.

Adding this experience in wind pressure to the knowledge in mechanics, that it is necessary to have a sharp edge on the knife or axe to cut with, then our conclusion is that a sharp-pointed or knife-like shape will move through the air easiest. With this idea in mind it is natural that we should call the body line which presented a fairly sharp front to the wind and long smooth lines along its sides a streamline.

Cuts Into Wind.

The reason why the automobile bodies are not true streamline forms is that they were all cut off sharply at the back and the long, tapering tail, which is necessary for a streamline is not there. When the sharp-nosed car cuts into the wind a hole is formed and this has to be gradually closed up. This would be accomplished if it were possible to have a long, tapering tail at the back of the car, but it is obvious that this could not be used, as it would make the car too long.

Torpedoes are built with streamlines; so also are fish. Fish have comparatively blunt noses and long tails. A true streamline is somewhat fish-shaped. It has a rather blunt nose and its largest part is forward of the middle, so its tail begins early and is long and carefully tapered. It is proportioned in length with regard to its diameter, and also in other respects. The proportions may vary a good deal, but these are its main characteristics. If a streamline form is taken and its tail is cut off, a gap or vacuum is formed behind. This vacuum is often noticed at the back of a train, which will be seen to suck up a cloud of dust and paper behind it when it is going along at a high speed. When the streamline body passes through the air, the tail fills the gap and so gives the minimum resistance to its progress.

Resistance to Air.

While the subject of air resistance to bodies is under consideration, it would be well to have a general understanding on the importance of air resistance to the car's ability and economy of performance. In the first place, consider the windshield resistance to the air. The air current strikes squarely on the flat surface and leaves a vacuum behind for a certain distance. Various eddies and back draughts are caused. On a roadster these are extremely unpleasant for the driver, and in a touring car the rear passengers suffer. A sloping windshield helps to deflect the air current in a better way and also decreases the head-on resistance.

The resistance which the car has to overcome is the resistance due to the speed of the car itself plus or minus the speed of the wind, according to whether it is a head or tail wind. For the sake of simplicity a direct wind will be taken so that complicated figuring can be avoided by ignoring the side winds. In order to determine the car's resistance to the air, the area of the surfaces that are presented must be determined. The parts to be considered are the radiator, radiator mudpan, windshields, fenders, front and rear; maximum width of the body, and the headlights. If tool or battery boxes and spare tires are carried on the side of the car or running board, they must also be taken into account. Not only do they offer additional resisting surfaces to the air, but they tend to break up the air streams, forming various broken and cross-currents.

Formula for Resistance.

In order to obtain an accurate idea of the power absorbed by the air resistance, an area of 25 square feet will be taken as the frontal surface affected by wind resistance, as this is a good average for an ordinary car. The formula for getting the wind resistance will be taken where P—0.003 AV A is the area in square feet, V the velocity in miles per hour, and P the pressure in pounds. This will give, for the speed of 10 miles per hour, 7.5 pounds; for 20 miles per hour, 30 pounds; for 30 miles per hour, 67.5 pounds.

The next thing to do is to find out how much power is used. This can be determined by the formula.

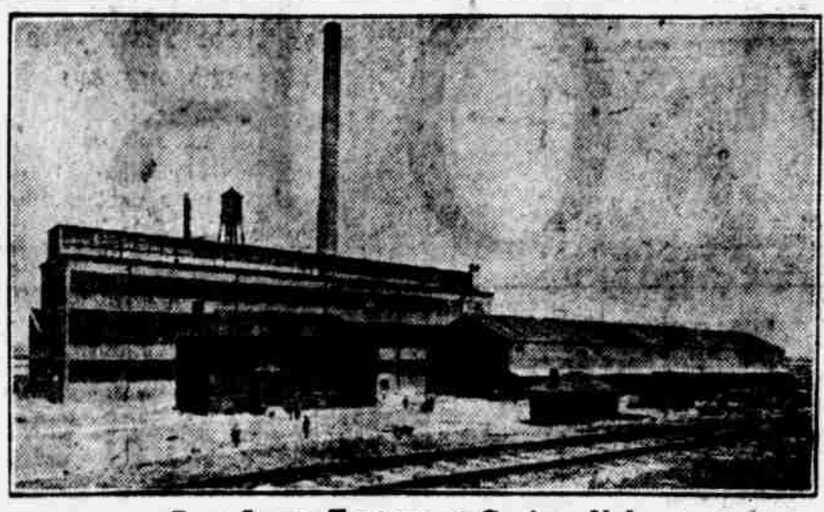
$$\frac{P \times \text{ft. per min.}}{33{,}000}$$

P is the pressure and 33,000 pounds per minute represent one horse power. Working out the three pressure obtained, the horse powers required are two, 1.5 and 5.5, respectively. It is noticed that the horse power required increases very rapidly with the speed, and if a speed of 60 miles per hour be taken, the pressure becomes 270 pounds and horse power required 43. This last condition could occur if the car were running at 30 miles per hour against a wind going at 30 miles per hour. This would result in the same wind pressure that would be had by driving at 60 miles per hour without a head wind.—April Motor Life.

Locking the Car.

Many modern cars are fitted with a battery ignition system in which the distributor arm is removable. By removing this arm the car owner makes it possible to steal his vehicle only by towing it away or by fitting another distributing arm. The arm may be removed by unclasping the distributor cover to which the wires are attached. It usually happens that there is only one way in which this arm will fit, so that there need be no worry about replacement.

Nebraska Beets May Win War for Nation and Allies



Beet Sugar Factory at Gering, Neb.

It is a far cry from the bucolic beet sugar fields of western Nebraska to the belligerent batteries of big guns of the allies along the western battle front in France, yet war has brought the two sections into intimate relationship.

A large part of the high explosives required to propel the immense projectiles used to wean the Hun from his worship of the god of war and the idol of autocracy are produced in the peaceful irrigated valleys of the western part of Nebraska.

Sugar, made from the beets grown in the semi-arid district of Nebraska, is a basic element in the making of high explosives. The raw product, treated with nitric acid, mixed with sulphuric acid, converts sugar into nitro substitute analogous to gun cotton and nitro glycerine.

Why Sugar Is Scarce.

Because Mars is ravenous for the food which reduces human beings to pulp is one of the reasons why sugar for human consumption is so scarce that it is seriously proposed to give it out in rations by means of sugar cards.

By the use of synthetic processes the modern beet sugar plants, located at Gering, Scottsbluffs, Baird and Grand Island, in this state, have reclaimed from the pulp of the sugar beet many important valuable by-products, but it remained for the necessities of war to reduce this to the nth power.

In the days when all was well with the universe, and before it was plunged into the hecatomb of world war, potash was a mineral product so plentiful and cheap that there was never a thought that it would ever be scarce and fabulously valuable.

German Had Monopoly.

Germany had a practical monopoly on the product and when her gates were shut as a source of world supply by her offensive the best brains of the nation's chemists were called upon to discover new sources of supply.

Almost by accident the potash lakes of western Nebraska were providentally found. Then came the discovery of the process of converting vast marine fields of kelp, found in the waters along the Pacific coast, into potash and iodine.

Greatest Discovery Comes.

Last comes the greatest conservation discovery of all, the process of reclaiming from beet molasses and the alkaline waters used in washing the sugar beets, and the bone black used in refining the sugar, the precious potash needed for making explosive nitrates and also for rebuilding impoverished soil areas in the eastern and southern parts of the country.

The sucrose content of beet sugar molasses contains a high percentage of potash, which is reclaimed from the sucrose by chemical destruction. This product, after it had passed the various stages of sugar extraction was so offensive that it could not be used for cattle feeds and was waste. Now it will be as valuable in proportion as the sugar itself.

The water that is used in washing the sugar beets and that is extracted in the centrifugal processes of macreation is heavy with basic salts and saccharate of lime, all potash producing.

Building Big Basin.

The Great Western Sugar company at Scottsbluffs has already commenced work on the construction of a big settling basin, 12 acres in extent and 30 feet deep to hold the water used in washing the beets and which hold in solution the alkaline and saline precipitates that produce the potash.

The same evaporating plants used in extracting the sugar from the pulp juices of the beets will be used to reclaim the potash.

Another industry that has lain dormant for ages has been developed by the war. That is the production of Epsom salts in this country.

Epsom Salts in Albany.

Brooklyn lake, in Albany county, Wyoming, is essentially a lake of Epsom salts, or sulphate of magnesia. Until the war the United States was supplied with the product from England, Spain and Italy. War demand for magnesia as an explosive element shut off a large portion of the American supply and as a result of the insistent demand the waters of Brooklyn lake are being evaporated and made to yield Epsom salts, and magnesia for this country.

The lake contains the largest visible supply of this product there is in the world and it can me more cheaply manufactured than any place else in the world, and after the war will remain an enduring and important American industry, born of war conditions.

Spare Latch.

In battery ignition systems there is usually employed a notched rotor against which presses the latch or tripper, with short springs attached. When this latch becomes worn, the entire system will fail to operate properly and it is a wise precaution to carry a spare latch in the tool box. It is not difficult to remove and replace this latch, which fits in but one way, so that there is no danger of placing it wrong.

Fuel Waste.

The correct proportion of gasoline for a perfect fuel mixture is .07 of a pound of gas to a pound of dry air. It is possible to operate on a mixture containing as much as .12 of a pound of gas to the pound of dry air, which is nearly twice as much gasoline as is needed. This wide range of mixture strength constitutes the greatest factor in wastage of gasoline The majority of car owners run more nearly at the maximum strength than at the minimum, which would give them better results. They are using nearly twice as much fuel as there is any need for. Think it over.