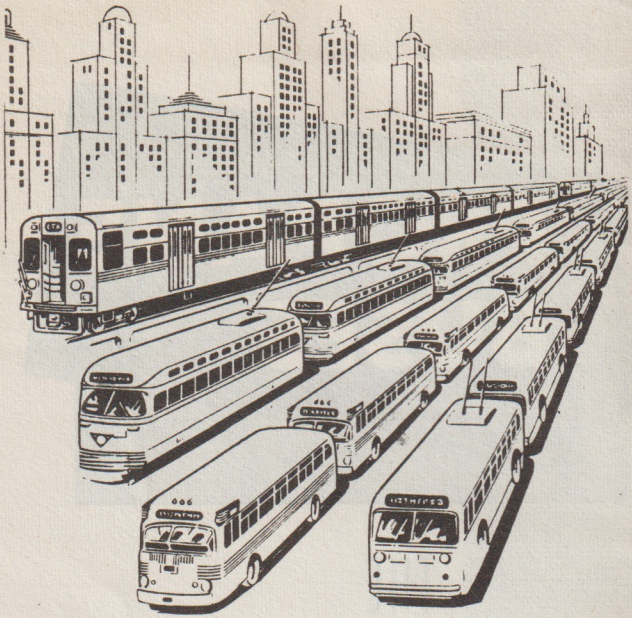
PROPANE BUSES

THE LATEST DEVELOPMENT IN THE TRANSIT INDUSTRY

CHICAGO TRANSIT AUTHORITY



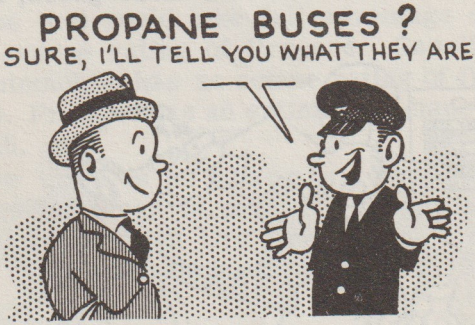
Since the beginning of Chicago Transit Authority's ten-year Modernization Plan, our owner-riders have benefited by a new equipment program unprecedented in local transit history. Slow and outmoded services have been and are being replaced with rapid, convenient services. Old, noisy, cumbersome vehicles are being replaced with new, modern P.C.C. streetcars, gas buses, trolley coaches, and Rapid Transit cars.

The most recent step taken toward a further realization of our goal was the purchase in August, 1950, of 919 more vehicles for early 1951 delivery. This was the largest order ever to be placed by any transit company in a single day. When delivery of these vehicles is completed, a grand total of 2,763 vehicles will have been placed in service since the beginning of the Modernization Plan.

Specifically, this history-making order called for the delivery of 70 Rapid Transit cars similar to the 130 (Series 6000) cars now in service on the Logan Square branch, 349 trolley coaches, and 500 Propane buses.

It is unnecessary to go into detail about all the equipment in this latest purchase. By now most everyone is familiar with the new Rapid Transit trains operating from Logan Square. Trolley coaches have met with approval for years, and we are assured that the new ones will be the finest ever. Propane buses, however, are familiar to only a relatively few persons. In fact, Chicago Transit Authority is the first transit company to order so large a fleet of these most modern buses.

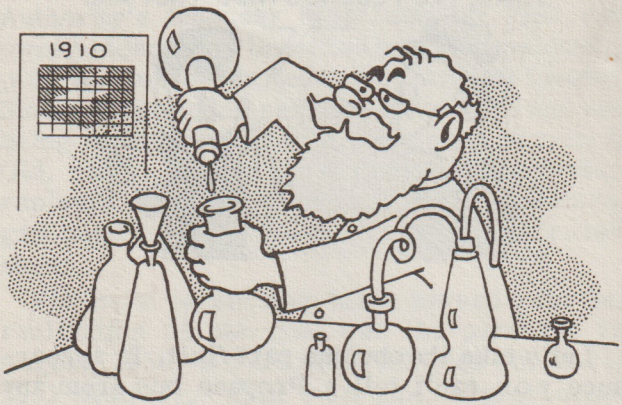
What are Propane buses? Our patrons want to know, and, of course, every CTA employe wants to know, too. When you are asked, you want to look up and say, "Propane buses? Sure, I'll tell you what they are."



Let's take the obvious part first. In appearance you can't tell a Propane bus from any other bus except that it is slightly larger, seating 51 passengers. But appearance is where the similarity ceases. The big talking point is performance; ease of operation; quiet acceleration; easy cold weather starting; smooth power; lower fuel costs; lower maintenance costs; no smoke; no knock or ping; no obnoxious exhaust odor. And what is it that gives these buses this superior performance? It is PROPANE, the fuel that furnishes the power.

Propane is no magic name. It's not even ultra-modern. As a matter of fact, the rural housewife has used this same type of gas for a good many years. She knows it, and perhaps you know it as "bottled gas," the same gas that is delivered in small cylinders to homes not accessible to city gas mains. From these small cylinders comes the gas for cooking, heating, and gas refrigerators that gives to rural and suburban homes some of the advantages enjoyed in city homes.

The history of Propane goes back forty years. Prior to 1910, in the refining of gasoline, diesel oil, lubricating oil, etc., and in the processing of natural gases for cooking and heating, certain gases were allowed to escape. They were allowed to escape because no one knew what to do with them. Then in 1910 scientists discovered that these gases, if put



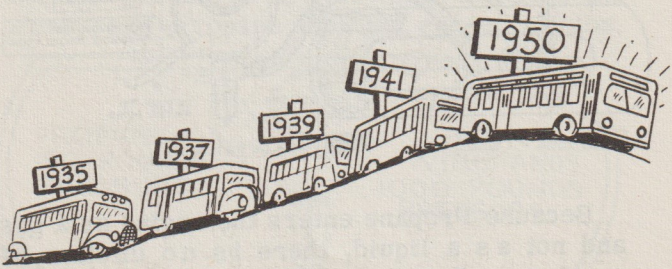
under pressure, turned to liquids having varying uses. They called these liquids "Liquefied Petroleum Gases" or, for short, "LPG".

In the beginning, Liquefied Petroleum Gases were used very little commercially. They were used for domestic purposes, but in such small quantities that the Petroleum and Natural Gas industries had a surplus supply. Then,

when the potentialities of LPG were recognized for their commercial value, industry began to use them. By 1924 LPG sales were mounting as more and more uses were discovered for them. Some of the uses for LPG were in anesthetics, synthetics, plastics, refrigeration, home heating, heating and drying ovens, treating ovens, and internal combustion engines.

In 1935 the first Propane buses were pioneered by a Northwestern Pacific Transit Company. It was a hard, tough engineering problem in those early days and there were as many disappointments as there were achievements. But as each disappointment was overcome, the industry gained another step forward. It wasn't until the post-war years that the toughest handling and operational problems were licked. The biggest problem was overcome with the design of a high compression engine that could take full advantage of the high octane rating of Propane. Gasoline for an automobile has an octane rating of from 70 to 90. Propane has an estimated octane rating of 125.

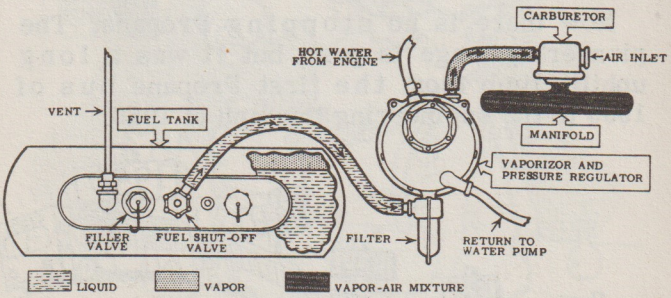
Now there is no stopping Propane. The pioneering stage is past, but it was a long uphill climb from the first Propane bus of 1935 to the engineering triumph of 1950.



Unlike gasoline, Propane remains in a liquid state only so long as it is kept under pressure. The instant it is released from pressure it returns to its gaseous state. For this reason, it is manufactured under pressure; transported to storage tanks under pressure; transferred from storage tank to bus tank under pressure;

and carried in the bus tank and fuel line under pressure. Propane can ignite only when it is a gas and mixed in the proper proportions with air. Therefore, between the tank and the engine, the liquid Propane must be changed to a gas and air must be added. The transformation to a gas is accomplished by means of a pressure regulator and a vaporizor heated by hot water from the engine cooling system. This gas is then drawn into the carburetor where it is mixed with air. From the carburetor, the gas and air mixed in proper proportion enters the engine. It is then ignited by spark plugs, and in every other sense acts in the same manner as gasoline to supply power.

SIMPLIFIED DIAGRAM OF FUEL FLOW



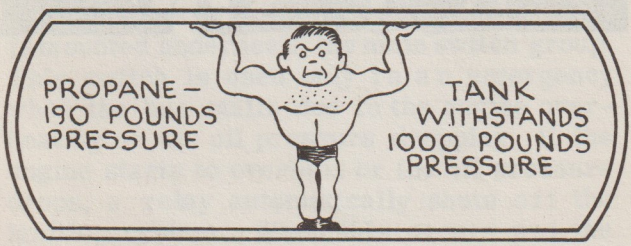
Because Propane enters the engine as a gas and not as a liquid, there is no dilution of crankcase oil. Oil change periods are extended to about twice that of a gasoline or diesel engine. There is less ring, piston and cylinder wear, which prolongs the intervals between motor overhauls. Propane burns clean and completely, leaving no carbon deposits, no smoke, no obnoxious exhaust odors. The cost of Propane is less than the cost of gasoline,

while the mileage, when using an engine designed to take advantage of Propane's high octane rating, is about the same. All of these factors result in lower maintenance and operating costs.

Propane is as safe as any volatile substance, and in many respects is less hazardous than gasoline. Gasoline fire starts with a flash explosion and then flaming gasoline runs and spreads until it is extinguished or burns itself out. Propane fire starts with a flash explosion but does not spread. It continues to burn at the source of the fire until it is extinguished or burns itself out.

Since Propane must be kept under pressure, and since Propane will not burn unless it is in a gaseous state and mixed with air, the only chance of fire is if the completely sealed-in fuel line develops a break or leak. Incorporated in the new Propane buses are automatic safety shut-off valves that cut off the flow of fuel in the event a fuel line or valve breaks.

Protection against breaks in the tank and fuel line is of vital importance, and no precaution is overlooked in achieving this protection. The tank is constructed of heavy 1/4 inch collision-proof steel capable of withstanding internal pressures of 1,000 lbs., although the pressure of Propane does not exceed 190 lbs.

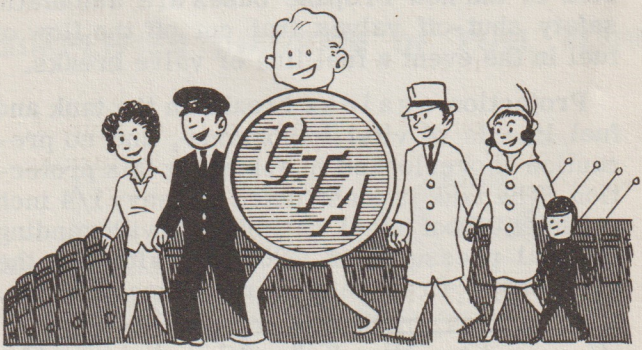


at 100° F. The tank is securely mounted on the frame, and the valves and fittings are recessed and well protected. The fuel line is heavy duty seamless copper tubing capable of withstanding high pressures. All joints are provided with special flared fittings to eliminate leaks common to conventional joints.

Should a leak occur, it is easily detected by smell. Although Propane, itself, has no smell, an odor similar to that of burned cabbage is introduced in its manufacture. This odor is burned up in the engine and does not manifest itself in exhaust fumes.

And that's the story of Propane. Propane, the forty-year-old fuel that comes into its own in the Transportation industry in 1950.

Chicago Transit Authority is proud to have the distinction of being the first transit company to bring to its riders a full fleet of these modern buses and extends its thanks and gratitude to all of its employes and patrons for their loyal effort and support in making possible the continuing additions to the Modernization Plan.



OPERATING A PROPANE BUS

The operation of a Propane bus is, in most respects, the same as the operation of a gasoline bus or diesel bus. There are, however, additional mechanical features and procedures that must be thoroughly understood by each operator of a Propane bus.

FUEL SHUT-OFF VALVE

A fuel shut-off valve is mounted on the fuel tank and is reached by opening the filler compartment door located at the rear of the bus.

The fuel shut-off valve must be opened before turning on the ignition switch. It is opened by turning the handle counter-clockwise as far as it will go.

When a bus is not in use, the fuel shut-off valve must be closed. It is closed by turning the handle clockwise as far as it will go.

BY-PASS SWITCH

A by-pass switch marked "IGN. BY-PASS" is mounted underneath the main switch group. This switch is used only in an emergency when the bus stalls due to the engine overheating or the oil pressure dropping. If the engine starts to overheat or the oil pressure drops, a relay automatically shuts off the ignition system. When this occurs and the bus is blocking traffic or on railroad tracks, the by-pass switch is used to move the bus to the curb or to a point of safety.

This is how to move the bus by use of the by-pass switch: Press the by-pass switch down while starting the engine and continue

to hold it down while moving the bus. After the bus has been moved, release the switch. The bus should never be moved more than 500 feet by use of the by-pass switch.

STARTING THE ENGINE

After turning on the ignition switch press down the choke button and continue to hold it down while pressing the starter button. The choke must always be used while starting, even when the engine is hot.

SHUTTING OFF THE ENGINE

Before leaving the bus for any reason, the ignition switch must be turned off.

If a bus is involved in an accident in which a fuel line may have been broken, both the ignition switch and the fuel shut-off valve must be turned off. Turning them both off insures protection against fire.

NOTES

CHICAGO TRANSIT AUTHORITY

Developed and prepared by Training Dep't.