3 - Actual size of the five most popular V-belt cross sections A, B, C, D and E. These sizes were determined after many tests and have been found satisfactory in service. Minimum sheave diameters for these belts are given in Table I, p 125

duces internal friction and heat. For the five popular belt sizes, A, B, C, D and E, minimum sheave diameters can be recommended. Table I gives these sizes, determined after many tests and found satisfactory in service.

Laboratory tests and practical experience show reasonable belt life can be expected with sheaves as small as the recommended minimum. If possible, it is even better to use sheaves somewhat larger than the minimum. Using a 9.0-in. or 8.6-in. sheave with a C section belt, for instance, is not the difference between success or failure of the drive. But a 10.6-in. instead of an 8.6-in. sheave does make a great difference in the belt's life. If belts on an 8.6-in. sheave have a 2-year life, it is not unusual with a 10.6-in. sheave for the same drive to have a belt life of 4 years or more.

So consider replacement costs when installing a V-belt drive. Larger-diameter sheaves may cost more, but life is longer and belts are not replaced nearly so often. Cost of replacing one set of belts usually offsets the difference in cost of the slightly larger sheaves. To under-design a drive that is used any length of time is poor economy.

Belt Speed. Maximum diameter of sheaves used on a drive is governed by (1) space limits and (2) belt speed. The first condition requires little explanation. If space does not permit as large a diameter sheave as desired, the only thing to do is to use a smaller one with grooves for enough belts to drive the load safely. Belt speed requires a more detailed explanation. Between practical limits, the larger the diameter of the driving sheave, the greater the belt speed and the more horsepower each belt on the drive transmits. For greatest efficiency, belts must travel neither too fast nor too slow. What are these practical limits that govern selection of proper speed? Horsepower rating tables in V-belt manufacturers' catalogs show a recommended speed of 1000 to 5000 ft per min, depending on the diameter of the driving sheave.

There is a reason for these limits on speed. A belt at slow speed transmits less horsepower than one traveling faster. So the drive as a whole requires more belts when speed is low. Since the power rating of a belt drops off rapidly at speeds below 1000 ft per min, it is not economical to go below this point on most drives.

An equally good reason exists for limiting top belt speed. As speed approaches and exceeds 5000 ft per min, centrifugal force tends to stretch belts and throw them away from the groove. Thus, the effective arc of contact on the sheaves is reduced. Another consideration in speed is safety. Most cast-iron sheaves are constructed to withstand safely a rim speed not in excess of 5000 ft per min. While special drives are sometimes constructed for use at lower or higher speeds, it is best to observe the recommended limits for the average drive.

Arc of Contact. Arc of contact on sheaves must be considered when selecting an adequate drive. Horsepower ratings for different-sized V-belts are based on a 180-deg arc of contact. This arc depends on the difference in sheave diameters and the distance between shaft centers. If one sheave is smaller than the other, it has less than 180-deg arc of contact. The smaller the arc of contact, the greater the number of belts required for a given drive.

Base V-belt-drive selection on the prime-mover and load characteristics as well as on required horsepower and belt speed. Do not select size and number of belts for a drive on the basis of the prime mover's nameplate horsepower alone. Considerably more power is often needed to start a load than to drive it at normal speed.

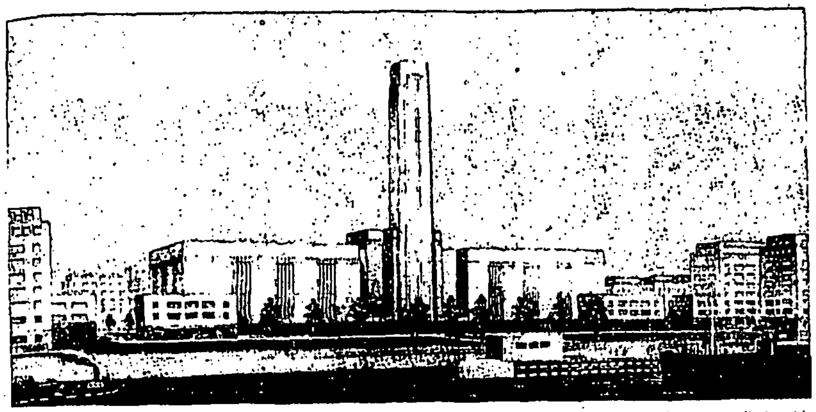
It makes a difference whether the driving unit is a squirrel-cage motor with high starting torque, a dc motor with comparatively low starting torque, or a gasoline or diesel engine with pulsating characteristics. Similarly, the load thrown on the drive depends on

(*Continued on page 160*)

TABLE II—RECOMMENDED CROSS SECTIONS OF V-BELTS FOR DIFFERENT MOTOR HORSEPOWERS AND SPEEDS

Motor horsepower	Motor speed 1800	1200	900	720	600	514	450
½-¾	A	A	A	—	—	—	—
1-1½	A	A	A	—	—	—	—
2-3	A or B	A or B	A or B	A or B	—	—	—
5	A or B	A or B	A or B	B	—	—	—
7½	A or B	A or B	B	B or C	B or C	—	—
10	A or B	B	B	B or C	C	—	—
15	B	B or C	B or C	C	C	—	—
20	B or C	C	C	C	C	—	—
25	C	C	C	C	C	—	—
30	C	C	C	C	C	—	—
40	C	C or D	C or D	C or D	D	D	—
50	C	C or D	C or D	D	D	D	D
60	C	C or D	C or D	D	D	D	D or E
75	C	C or D	C or D	D or E	D or E	D or E	D or E
100	C	D	D	D or E	D or E	D or E	D or E
125	—	D	D	D or E	D or E	E	E
150	—	D	D	D or E	E	E	E
200	—	D	D	E	E	E	E
250 and over	—	—	—	E	E	E	E

Note: When two belt sections are shown: If sheave pitch diameters are limited, use the smaller belt section. If sheave face widths are limited, use the larger belt section. If no limitations, use belt section providing the most economical drive.



BANKSIDE GENERATING STATION replaces old plant on the Thames River opposite famous St. Paul's Cathedral. Architectural features of plant building were designed to fit in with surrounding territory, which also dictated use of oil as fuel

London Plans First Oil-Fired Central Station in Britain

New Bankside Generating Station will have flue-dust removal equipment that will also remove sulphur compounds by washing. Ultimate plant will have four 60,000-kw turbine-generators

By H J RANDALL, *Managing Director, London Electric Lighting Co*

▶ FOR OVER 50 YEARS a generating station has stood on the Thames River in the heart of London, opposite St. Paul's Cathedral. More than three centuries ago this Bankside district was London's cultural and recreational center, but it has long since been industrialized. When a power plant was erected, almost on the Globe Theatre site where Shakespeare's plays had been produced, little thought was given to town planning, architectural beauty and smoke abatement.

The station, designed for efficient operation at minimum cost, was a feature of engineering interest for visitors to London. In course of time it became obsolete, and in 1939 it was decided to rebuild. But World War II caused an indefinite postponement, so the station was operated despite much damage from enemy bombing.

In 1945 when rebuilding was again decided upon, there was wide public interest in town planning and smoke abatement. The London City Council, *which produced a plan for new development* of bombed areas, scheduled the Bankside district for offices, light industries and buildings for cultural purposes. The station owners decided that the new plant should be worthy of the rebuilt London. They commissioned Sir Gilbert Scott to design the building. Although the architect's design was admirable much opposition arose to rebuilding the station on its present site. The government settled the question by deciding that because of acute shortage of generating capacity and scarcity of sites in London the station should be rebuilt at the same location. It was stipulated, however, that oil should be used instead of coal. Hence, Bankside will become the first oil-fired station in Britain and the first of its kind in the world designed to prevent emission of flue gas with a high sulphur content.

Building. The new building will be about 230 ft behind and parallel to the river bulkhead so space will be ample for a planned riverside boulevard. Foundation will be built on London blue clay about 34 ft below grade. Water-bearing ballast and silt overlie the clay, and the building area will be dammed off by steel sheet piles.

Wherever possible the circulating water tunnels will be deep enough to be driven into the clay, but some compressed air tunneling will be unavoidable. A river jetty will accommodate oil tankers and barges. Fuel will be pumped ashore through pipes in a tunnel between station and jetty.

Turbine-Generators. The 240,000-kw ultimate station capacity will be made