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Economical, weed-free beauty and erosion control

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PROTECTS THE SOIL

Cellin fiber mulch creates absorbent "mini-umbrellas" to protect the ground against rain. This allows the rain water to seep into the soil slowly, preventing erosion.

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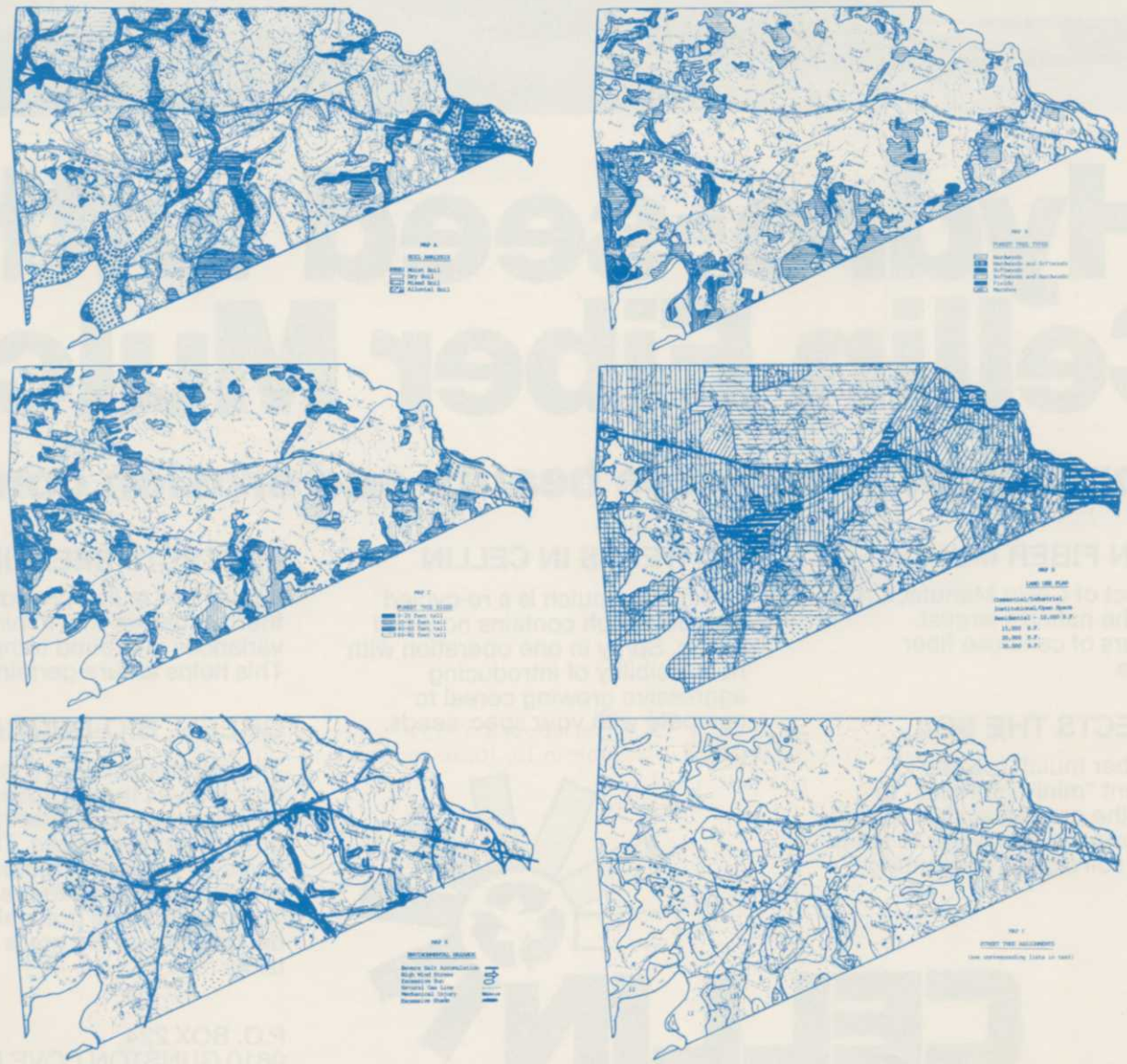
these areas must be tolerant of high salt concentrations in the rootzone.
2. High wind stress: Areas which are open, require hardier trees and guy wires until the trees are established.
3. Excessive sun: Areas which are open to full sun require trees which are not suceptible to sun scald.
4. Excessive shade: Areas which are shaded by large buildings, land forms or an established tree canopy exceeding 60 ft. in height, require trees planted in these areas to be tolerant of shade.
5. Natural gas lines: Many streets contain local gas distribution lines and damage to trees from escaping natural gas cannot be avoided. Any major gas transmission lines going through the community should be avoided to prevent potential tree damage.
6. Mechanical injury: Areas which are subject to severe mechanical injury, frequent construction and sites of severe soil compaction, require trees to be small in size and where problems are most severe, containerized trees should be considered.

Tree selection process

A tree's shape or form is an important consideration when selecting a tree for a particular site. Definitely shaped street trees and ornamental flowering or fruiting trees should be carefully selected and located to avoid distractions to a car's driver while at the same time providing an accent denoting a special view or structure. The trees should be used to frame pictures in the landscape, to hide objectionable views and to assist in defining the edge of the roadway and enhancing spatial qualities. Spacing between trees should vary from 30 to 150 ft. to create a naturalized appearance, and if one tree dies or is removed, it does not spoil the continuity of the planting. Trees need sufficient unpaved areas for maximum health and vigor. They



Six maps are necessary to combine all factors affecting street trees to achieve the best plan. Map A - soil analysis, Map B - forest tree types, Map C - forest tree sizes, Map D - land use plan, Map E - environmental hazards, Map F - street tree assignments.

should not be dangerously close to traffic in the street and should, therefore, be planted behind the sidewalk to achieve as much growing environment as allowable.

Trees should be planted in locations which define an activity. For example, a corridor of trees promotes movement and decisive action; and screening provides a blocked vista and results in interest in the foreground.

Aesthetics and function should work together during the selection of an urban tree.

A diversification formula has been developed to prevent an over dependence on a single genus such as elms or oaks. The diversification formula was established by the International Society of Arboriculture and is now an accepted standard throughout the United States. The formula is defined as a planting plan containing no more than ten percent of one family and five percent of one species.

In order to develop a concept of complementary and coordinated tree planting, the trees selected previously have been grouped together into associations. Tree associations are defined as consisting of a group of trees which are aesthetically harmonious as well as being similar in environmental preferences and tolerances.

Using the lot size as an indication of relative home value and also of potential area for tree growth, the lists are delegated according to mature tree stature, color and visual appearance.

All of the previous information is brought together to form a street tree planting plan. The different areas of soil types, existing vegetation and environmental hazards can be combined on one map to illustrate different tree planting programs. Each different area contains a different tree list. The tree list is derived by an analysis of the specific environmental qualities combined with the diversification formula.

Thus, lists are established which correspond to a street tree assignment map and indicate the most suitable trees for each area.

The final selection of a tree should be determined by the municipality's staff working in conjunction with the plan, any local site problems, and the property owner.

The final section of every master plan should pertain to established policies related to the care of street trees. These policies should be approved by the community's tree policy making board or elected officials.

Policies can be prepared to indicate a planting policy, a tree trimming policy, a tree removal policy, a spraying policy, and perhaps procedures to be used for implementing each of the policies.

WTT

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D

SELECTING THE RIGHT ENGINE FOR AN EXISTING PUMP SYSTEM

By John A. Kerr, assistant editor

If you need to replace an engine in a spray unit or you are building your own, some basic criteria exist for picking the right engine. Pump manufacturers often buy engines from different companies and many of these engines are interchangeable.

The main consideration is sufficient horsepower. This depends on the type of pump you're using. According to Bob Oberg, an engineer at Broyhill, a piston pump requires considerably more power than a centrifugal pump. If you're using a centrifugal pump for high pressure and low volume spraying, power requirements are less than if you're using it for high volume and low pressure, as in a transfer operation. Then it requires much power to move the weight.

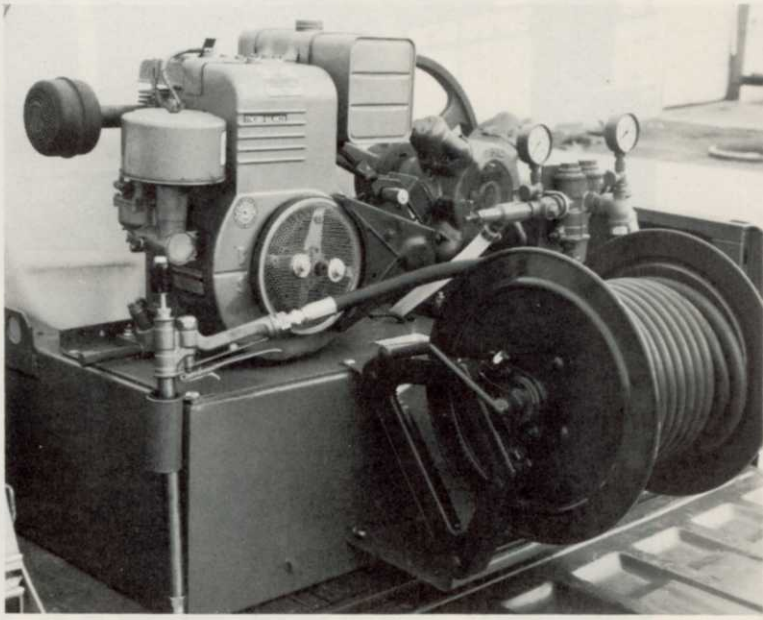
A centrifugal pump is self limiting. With too small an engine, it will slow down but still run; however, a positive displacement pump in that situation won't run at all. For example, you could use a 3-horsepower engine on a fairly big centrifugal pump and get it going but on a good-sized piston pump, it wouldn't start.

"Generally," Oberg says, "our centrifugal pumps seem overpowered because we put enough engine on them to handle big volume if necessary. In a common spraying situation, a pump may be able to handle 100 gpm even though an operator only needs 5 or 10; so he's not pulling all the power he could." You can also get by with a small engine for a roller pump, unless you put so much resistance against it that it has to create 200 to 300 pounds of pressure in order to work.

Broyhill uses Briggs & Stratton, Kohler, and Tecumseh engines for its pumps. Oberg warns of comparing an electric motor with a gas engine when making your decision. It's possible to drive a pump with a 2-horsepower electric motor that won't even start with a 2-horsepower gas engine. "A rule of thumb is that it's going to require twice as much gas horsepower as electric horsepower," Oberg says. The reason is: you have more power available because you can pull, at least momentarily, more amperage through the electrical system and increase the actual output of an electric motor. An electric line has the capability of giving you an initial surge of power that a gas engine can't. Also, in a higher elevation where the air is thinner, a gas engine will lose power.

Most pump manufacturers rate equipment according to actual electric horsepower. The horsepower and torque of an engine are geared to maximum rpm. Torque is an important factor in running your pump. Maximum rpm does not produce maximum torque.

You must also consider rpm's of the pump when selecting an engine. When you hook an engine to a pump, you should know how fast it is supposed to run so you can properly match it. There's nothing that will ruin a pump quicker than running it faster than it was made to run. You will cavitate the liquid, trying to suck more in than atmospheric pressure can push and cause the pump to wear itself out.



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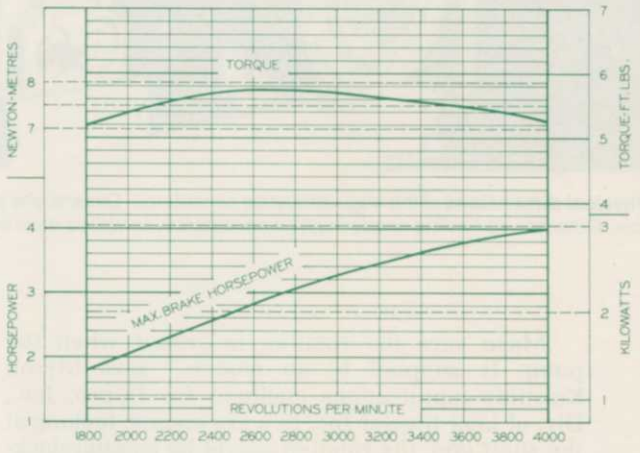

Maximum horsepower is obtained at maximum revolutions per minute. Maximum torque is obtained at a lower rpm. High rpm can lead to rapid engine deterioration. Therefore, optimum running speed should be designed near the maximum torque level.

If a pump has a 3,600 rpm engine and only needs 1,000 rpm to produce an efficient spray, you need a gear reducer — a system of belts and pulleys — to gear the PTO shaft down. Overspeeding the sprayer will cause internal damage.

Rpm's range from 600 for positive displacement pumps up to 4,000 for centrifugals, with some even reaching 5,000. Depending on the type of pump, rpm will vary greatly. As a general rule, centrifugal pumps have to run at a high rpm and positive displacement pumps — gear, roller, and piston — at a lower rpm.

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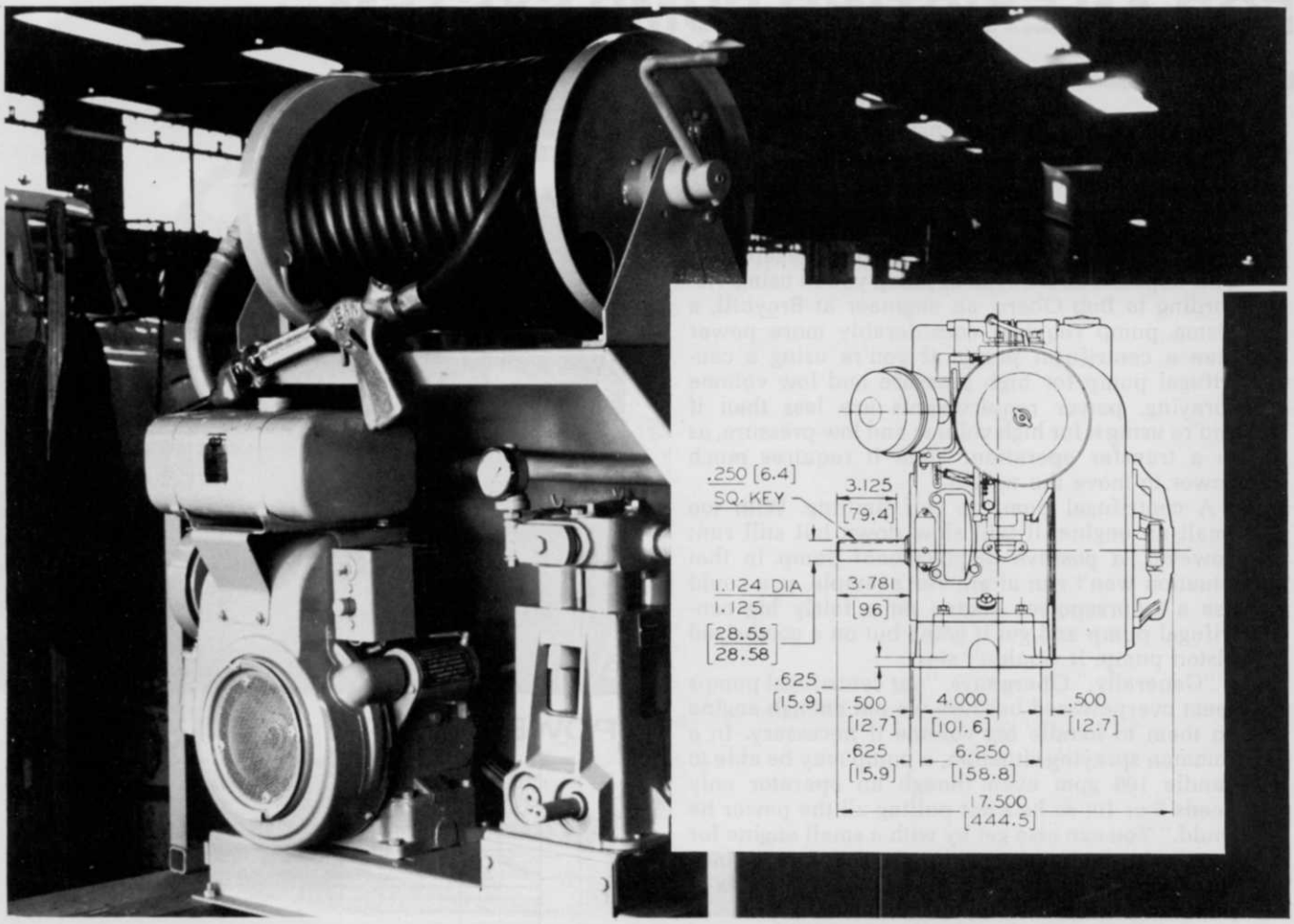

Physical dimensions of the engine must be considered. Dimensions of importance are base mounting holes, shaft size and length, and overall size. Exhaust and cooling needs must be considered, as well as ease of access for maintenance.

"Make sure the rotation is proper when the pump is coupled to an engine," says Myron Koistinin, applications engineer for Hypro, Inc., Div. of Lear Siegler Inc. In a gas engine, looking at the shaft end, the rotation would be counterclockwise. A roller, vein, or gear pump also must be rotated in the right direction. With a piston pump, you don't have to worry about it because a valve determines the flow.

The frame for an electric motor must be the proper height. A "58" is a standard frame for most electric motors. Some pumps take more torque to run and may need a capacitor for more starting torque.

Koistinin also suggests selecting a crankshaft with a fairly common diameter, length, and keyway. "If you get a motor or gas engine with an oddball shaft size, you have trouble getting pulleys and couplings to match," he says.

You have to look for pilots on the block, the machined surface that may be altered to accommodate a generator and other attachments, says Les Heinemann, service specialist in the engineering department of Kohler Co. "You have to make sure the pilots match so that if there is anything like an electric clutch hooked up to it, it's going to bolt to the block," he says. A bolt circle that doesn't match can also cause trouble.

Physical dimension of an engine is also important. Is it going to fit into the space you have available? You want to make sure where you're mounting the engine, also. Is it a standard engine without a blower or a directed air engine? If you put it in a combined area, are you going to get enough cooling?

You may consider fuel tank capacity if changing engines, says Jack Custer, product specialist for FMC, Agriculture Machinery Div. In a large operation, it saves time to have an engine that runs for a long period. You also need the right kind of pulley ratio, which depends on how fast you want to run your engine and thus how quickly the pump will turn.

Most manufacturers have replacement engines for the sprayers they build. But when it comes time to change engines because you are dissatisfied or discover new uses for your present sprayer, these will be some of the things to consider. **WTT**