

TO REPAIR OR REPLACE?

By Tobin Synatschk, PE

Water districts are faced with this decision frequently on the many pumps, blowers and drives that make up their water and wastewater systems. In the past, a rule of thumb was used to make this decision based on the cost of the repairs compared to the cost of a new replacement unit. The adage stated that if the repair was greater than 50% of the replacement cost, then it was better to replace the unit. The origin of this rule is unknown and the line of logic it follows questionable. The best guess is that for complicated equipment with many moving parts, a repair only brings a portion of the total machine back to manufacturer's tolerances. If only half the machine were repaired, it might make sense that the other half may fail in short order and thus the total cost would be more than a new unit.

For most of the pumps and blowers that water districts use, this is not the case. When this equipment is repaired in the local shops, they usually return the pump or blower to "like new" condition replacing all the bearings, wear rings, seals and straightening shafts. The majority of the equipment used is not complicated and without many independently moving parts.

The key to making a good decision is to make sure that you know what the problem was and what caused it. Spend time asking questions of the operators on what they saw before the failure, how old is the equipment, what is the

service history of the equipment and has it failed like this before? Are there installation issues that caused the failure or external factors that can be eliminated?

Once you are sure that a repeat failure is not imminent, then determine the criticality of the equipment. Is this the only unit that you have? What level of redundancy or back-up is available? What is the level of utilization for the equipment? These factors should influence your decision. For instance, take a district that only has one water well as the sole source of its drinking water. A motor failure in this instance would demand a rapid and immediate repair or replacement depending on the

damage and the availability of new motors. If the district owned a backup motor, had multiple interconnects with neighboring districts, or rental motors were available, you might consider a repair even if the cost was near 75% of the cost of a new motor. As the level of redundancy goes up, the focus should switch more to cost savings since redundancy becomes less of an issue. For the same district that now receives surface water, the criticality of the well becomes less. This approach is called Risk Based Asset Management and also applies to the level of maintenance before a failure.

Another factor that must be considered is the uniqueness of the equipment. Many of our client's water wells have what are considered "custom" motors by today's

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standards. To buy a new one would require a special order and would take 18 to 20 weeks for delivery. These motors represent a large investment by our Clients and to throw them away would be a tragedy. Many of the motors from 20 years ago are better made than today's motors and thus repairing these motors should always be considered. Consider the availability of parts in the decision as well. For that one, rare, piece of equipment that does not add special value to your client and parts are hard to find, consider replacement. For unique equipment that does add value, stock parts ahead of time for the next repair.

The following is a list of items that are commonly problems with replacing equipment:

1. The new equipment's performance characteristics do not match the original equipment and will not perform the same.
2. The manufacturer of the replacement equipment is a lower quality manufacturer than the original. This may mean more frequent repairs in the future or the equipment may be a "throw-away" type that cannot be repaired economically.

Repairing equipment has challenges too and the list below are some of the pitfalls encountered:

1. The equipment is taken to the service company's shop of choice and disassembled before the district is aware of a problem. Moving the parts to another shop is inadvisable since parts could be lost and the shop has the upper hand on any negotiations since they have the equipment.
2. Sometimes there is no incentive for the repair shop to give your client a good price on repairs. They often have the equipment already disassembled and usually have time on their side. Often they work directly for the service company, instead of the district, so they do not have to compete for the district's business.
3. When supplying both the repairs and the new equipment, the shop can fix the repair price to always exceed 50% of the new equipment price.
4. Some of the shops quoting repairs are not the factory certified repair center. This might be risky and could lead to higher prices on the replacement parts.
5. Many of the repairs are made by shops specializing

in the repair of other equipment which doesn't mean that they do a bad job, but that it is not their specialty.

Issues common to both replacement and repairs:

1. We have seen an increase in the use of repair shops who do not pull or set the equipment in the field. Often the service company performs the pulling and resetting. Many repair shops provide this service as part of their repair, and it can be cost effective. Having one turn-key party responsible for all aspects of the repair or replacement can benefit the district on warranty issues.
2. Equipment is often rented to replace the unit under repair even though a stand-by unit exists. This is wasteful spending.

There are a few good things that can come out of all this, and it is not all bad:

1. Sometimes new equipment is more efficient than the old equipment. More efficient equipment can pay for itself if the difference in the efficiencies are great enough. Be wary of "greenwash." or the overstatement of efficiencies to appear more "eco friendly."
2. Replacement gives the Engineer the opportunity to determine if the equipment is correctly sized for the current load and new equipment can be selected that better matches the existing duty conditions.
3. Newer equipment can incorporate new technology or designs that makes it not only more efficient but easier to operate, increases flexibility or improves performance (such as less surging or clogging.) The need or desire for these features may drive the decision to repair or replace.
4. Some clients want the best of everything and having the newest technology is important to them.

SUMMARY

When faced with a decision to repair or replace, be sure to weigh all the factors and take steps to assure that a repeat failure is not imminent. Determine if the existing equipment was properly sized for existing and future loads and insist on the use of factory certified repair centers.

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