

ANY BUS WILL DO

TANK GAUGING • THERE IS NO LONGER ANY NEED FOR TERMINAL OPERATORS TO HANG ON TO OLDER GAUGING SYSTEMS, AS HANS WESTERLIND* EXPLAINS

THERE ARE A lot of tank storage facilities out there that have been in service for many years. Often the same applies to their tank gauging systems, which may have started to become less reliable. As safety and environmental protection is a growing concern this could present an unacceptable risk for the facility.

Historically, most tank gauging equipment suppliers only had one bus option for communication between the control room and the gauging equipment on the tank. This electrical interface and protocol software was more or less specific for each manufacturer, meaning that level gauges, temperature devices and other equipment from another manufacturer could not be connected to this bus.

If a user wanted an extension of the system, a partial upgrade or an exchange of a number of tank gauging units, the only practical

alternative was to purchase from the same supplier as before. To install equipment from another supplier required separate cabling for another fieldbus, a second operator display in the control room, a second interface to the existing DCS system, and so on.

That may have the effect of encouraging terminal operators to stick with out-of-date equipment, such as mechanical float or servo gauges, as an upgrade to more accurate and reliable gauging equipment could involve the replacement of the entire system.

There is also the issue that any changeover will take time; during this period it may be necessary to have a large number of tank gauges out of operation. This situation requires a special effort from the operations department, including an extensive period using manual tank gauging, and can be a safety issue if not handled with care.

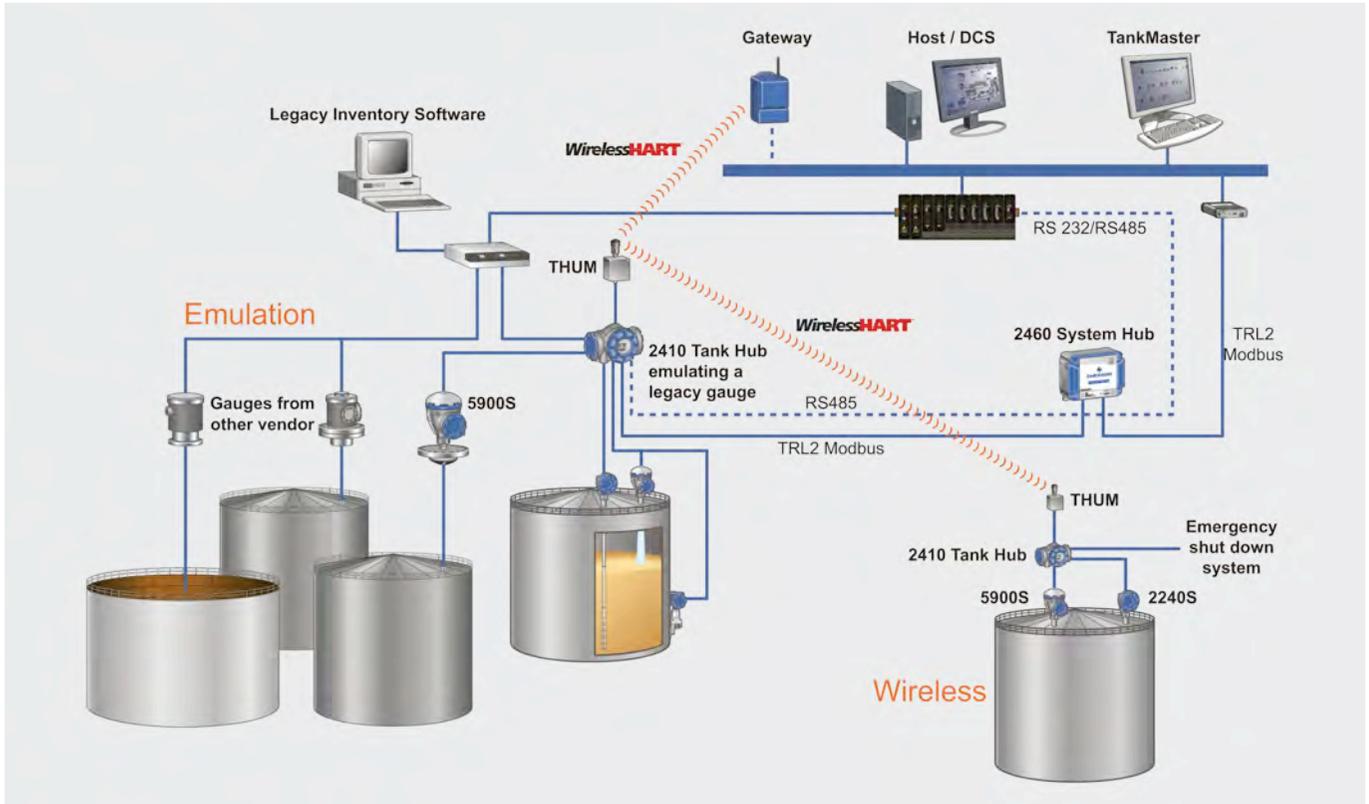
Ageing level gauging systems can also require extensive maintenance and for some older mechanical gauges it may be difficult and expensive to source replacement parts.

DON'T WAIT TO CHANGE

This unsatisfactory maintenance condition does not have to be accepted, since today there are tank gauging devices available that can easily solve the entire problem. "Tank gauge emulation" makes upgrading of these systems easy and cost-efficient, meaning that an existing tank gauge installed on a tank can be exchanged for another totally different type of gauge. After this exchange, the existing tank gauging system will not see any difference between the new emulating level gauge and the old level gauges. A number of aspects have to be considered when doing this exchange:

1. The emulating level gauge should be electrically compatible with the existing system fieldbus. Poor compatibility could cause the old system to malfunction, even if the emulating gauge works well.
2. The emulating level gauge should be software-compatible with the existing system. There may be software commands sent out from the tank gauge master, which are not relevant for the emulating device. As an example: a radar gauge emulating a servo gauge might receive the command "raise the displacer to top". This is obviously not relevant for a radar gauge, but the gauge must still give a proper response back to the tank gauge master unit, otherwise an alarm message could occur.
3. The software compatibility can often be on different levels for various emulation applications. Most common is that emulation is supported for measurement data only. This implies that all measured data (level, temperature, pressure, alarms, etc) will be sent from the emulating gauge to the tank gauge system master. Initial configuration of the emulating level gauge cannot be performed from software in the tank gauge system master, but has to be made from some other unit (e.g. a laptop PC or hand-held terminal).
4. All measured data that the tank gauge system master expects to receive from the level gauges must be supported.





If, for example, pressure, density, flow rate or some other data is measured by the existing system, then the emulating level gauge must be able to produce the same measurement data.

There are a large number of older float and servo gauges from a variety of providers still in use today. Although they use a variety of fieldbus standards, the fact that they have long used the same fieldbus hardware and software protocol means that they are in general suitable for emulation.

EMERSON'S OFFERING

The options for emulation are, though, few in number. One system that does offer widespread emulation is the Rosemount 5900 from Emerson Process Management. Although Emerson, like other gauge suppliers, has its own fieldbus, its modular approach allows for the emulation of a large number of other level gauges, including older mechanical types.

CAREFUL DESIGN OF EMULATION SYSTEMS CAN BUILD IN THE CAPABILITY TO UPGRADE AGAIN LATER WITH NO NEED FOR ADDITIONAL FIELDBUS CHANGES

Further, the the modular design fieldbus selection is not limited to emulation of legacy level gauges; rather, the user can select some other type of the common standardised fieldbuses such as Foundation fieldbus or Modbus. This gives the user the option to change the fieldbus selection in the future.

Take the following example: a refiner needs a partial upgrade of a limited number of level gauges. The company selects modern radar-based level gauges with the emulation function that corresponds to the existing old tank gauging system.

This step immediately begins to deliver savings in maintenance costs; those savings can be put towards a full replacement of the old system. At that point the company can also switch to a standard fieldbus, since the new emulation gauges are always equipped with the standard radar level gauge fieldbus as well and this can be switched on at any time.

If at some point in the future the refiner decides to also use Foundation fieldbus for the tank farm area, the system can be converted to Foundation fieldbus communication without exchanging the whole level gauging system. Decisions can be taken without ruling out other

possibilities, and further expansion possibilities are not excluded. The refiner can even decide to go back to the old fieldbus without additional costs.

In summary, a refiner or terminal operator now has the option to mix various types of level gauges from different suppliers without having bus incompatibility problems. There is no reason to accept high maintenance costs and poor performance on old existing mechanical level gauges due to bus incompatibility problems. It could in most cases be far more economical to spend maintenance money on a purchase of an emulating radar level gauge instead of spending them on worn out mechanical equipment.

Project implementation can be far easier with a minimum of operational disturbances by doing a gradual exchange of an existing tank gauging system based on emulation. When full exchange has been achieved, the user has the option to select the type of fieldbus that he prefers with a minimum of costs. **HCB**

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