Return On Assets (ROA) is a key measure of operational performance. The higher the value, the more efficiently a company is using its assets. In most plants the assets are not used to the full, either because of a lack of an overall strategy or the poor use of the information they provide. This article examines a number of ways in which to increase ROA, with particular reference to fieldbus technologies.

The traditional way of estimating the value of a plant asset, e.g. an instrument, valve, actuator, frequency converter etc. is to calculate the Return On Investment (ROI). In this calculation the cost of purchasing, installing, maintaining and operating a device throughout its life cycle is compared to the income it generates. This provides a perfectly adequate basis for financial calculations, but includes neither the consequences of a sudden breakdown nor several operational aspects such as:

- Is this the best device for the job?
- Is the device being used in the right way?
- Is the device operating correctly?

Eugenio F. da Silva Neto, Peter G. Berrie

Peter Berrie is Marketing Communication Manager at Endress+Hauser Process Solutions in Reichen/Basel, Switzerland.
T +41/61/715 7340
peter.berrie@solution.endress.com

Eugenio F. da Silva Neto is ControlCare Product Manager at Endress+Hauser Process Solutions in Reichen/Basel, Switzerland.
T +41/61/7157371
eugenio.silva@solution.endress.com
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amixon GmbH
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Phone: +49 (0) 5251 / 68 8888-0 · Telefax: /68 8888-999
eMail: info@amixon.de · www.amixon.com

Are device capabilities being used to the full?
What is the impact on the business if a specific device fails?

For example: Are device capabilities being used to the full? It is a well known fact that the majority of HART transmitters are used as simple replacements for 4-20 mA devices. The digital information they provide is not used, and only a few companies utilise digital device configuration and monitoring. Since there is no price premium on HART devices, the Return on Investment (ROI) is the same as for traditional devices, despite the fact that they are being “underused”. So how can the value of an asset be adequately assessed?

For some time now, the ARC Advisory Group in the USA has been advocating the use of a Return On Asset (ROA) calculation defined as follows:

- Return on Assets (ROA) = Net Income/Total Assets
  since Profit Margin = Net Income/Sales
  and Asset Turnover = Sales/Total Assets
- Return on Assets (ROA) = Asset Turnover x Profit Margin

Without going into detail about Asset Turnover, it can be said that a major factor in achieving a high ROA value is ensuring the availability of plant assets. Here operational aspects come into play. If the digital signals offered by HART devices are used to check their health, for example, this will be reflected in a higher ROA. In fact, any improvement in the utilization and management of assets will have the same effect and it is here that fieldbus technologies, whether HART, Profinbus or Foundation Fieldbus, offer distinct advantages.

NAMUR NE 91 Recommendation

Before looking more closely at fieldbus, it is interesting to know what a well designed asset management system should be doing. The figure on top shows an overview of the tasks based on the Recommendation NAMUR NE 91. Within the task of Enterprise Asset Management there are two main activities: Process Management and Plant Engineering. Process Management addresses the needs of production and Plant Engineering manages the means of production. Both activities include further tasks that may be performed offline because real-time data are relatively unimportant or must be performed online because real-time data is essential. Finally, there are the assets themselves, which comprise not only individual com-
ponents such as sensors, actuators, and system components but also aggregate units such as the plant areas, process cell, control modules and plant equipment. The performance of the plant can be optimised at any point within the structure, provided the information is there to do it. In terms of a production facility in the process industry, the structure above transforms to the classical enterprise component pyramid. There is another view which turns the classical enterprise pyramid upside down, that of information requirement.

The figure above shows that the primary source of data within a process plant is the instrumentation in the field. The information it provides flows to all levels within the enterprise where, depending on the task at hand, it is used immediately for control action or after evaluation, modification, display, archiving etc., as the basis for manual intervention, maintenance or human business decisions. The availability of process value, status information and other device parameters at any point in the plant is thus a key factor in applying techniques for process optimisation and increasing plant profitability.

It is here that fieldbus systems offer particular advantages. Together with other open technology such as Ethernet, OPC, XML and www, they are able to provide a standardized path between field, control and business level.

Fieldbus standardization ensures interoperability, ease of integration and common functionality, reducing costs during the engineering, commissioning and operating of the plant. Openness ensures that the best components can be used for the job, with no expensive lock-ins or adaptations to closed (proprietary) systems. Where fieldbuses really score, however, is with the quality of information. In addition to process value and status, a wealth of other information is available. Instrument TAG, Serial Number and Order Code are parameters carried by all fieldbus devices, others may be additional process values, health and diagnostic parameters. The question is, as explained earlier, whether a) the information provided and b) the inherent functionality is used.

Cases

As pointed out at the beginning of this article, there will be possibilities to increase ROI at many points in the enterprise. Where and how will depend on the system as a whole and the manner in which the plant is managed. In the
following, three cases are described which indicate how ROA can be improved by using fieldbus devices.

**CIF – using device capabilities to the full**

Control in the field (CIF) is inherent to the Foundation Fieldbus (FF) protocol and is one of the features where it differs sharply from Profinetbus at the present point in time. In CIF applications, the field device takes charge of the control loop, with a subsequent saving in e.g. I/O cards or single loop controllers. There are also additional advantages regarding loop integrity. CIF is not suitable for all applications, but should be a factor in selecting FF in preference to another fieldbus protocols. If your FF system is not using CIF, you are not getting a proper return on your assets.

**Condition monitoring**

Fieldbus devices supply status signals that allow central diagnosis of faults with e.g. a plant asset management tool. This can be used to support reactive or preventive maintenance activities. A step beyond, is the provision of predictive maintenance information by the instruments themselves. With knowledge of an approaching failure, the replacement of the device can be planned, avoiding expensive stoppages in production. These techniques are at various stages of development: valve signatures are common practice, health parameters for measuring devices are still in their infancy. By identifying and monitoring critical components, plant availability and ROA is increased.

**E-connectivity**

Many companies pursue a policy of reactive maintenance for non-critical devices. In such cases, it is essential to find a replacement device or spare part as quickly as possible. At Endress+Hauser, the serial number carried by a fieldbus device is a key element in the internal production records of the instrument itself. With the appropriate tool, a web connection can be made to the company’s database where device information such as “birth certificate”, production data, calibration data, changes in family design, spare parts etc. can be viewed. The replacement process is accelerated and risk of human error reduced.

**Conclusion**

In this short discussion of Return on Assets, we hope to have stimulated you to ask the following questions:

- Are my assets working to their full capacity?
- Am I using the information they provide to the full?
- Is ROA culture incorporated in my organization?

If you can honestly answer all with yes, congratulations – your assets are earning their keep! However, do not sit back and take things easy. Every advance in fieldbus technology increases the possibility of using your assets more effectively, because there is always something to improve.

*This article is an abridged version of a paper first presented at the 9th DCS Conference in Liliujtired, Hungary in 2003. It is published with kind permission of the organiser.*

*Achema*

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