Ideas are transformed into innovations through a research and development process. In this issue of ABB Review, we highlight products and solutions that have progressed through the ABB development process to the stage of proven prototypes or even launched products.

Innovation highlights

At ABB, 70 percent of our sales come from products that are no more than five years old. And yet, many of these must remain in operation for 25 years at least! Compare this to companies in the telecom industry, for example, where the portfolio renewal is no doubt faster, but it is coupled to shorter product life and product support expectations. However, no matter the industry, certain factors are the same if a company and its product portfolio are to remain competitive. This includes the right mix of fresh ideas with proven concepts, increased functionality and attractive pricing. And innovation is what this issue of ABB Review is highlighting. From a long and impressive list, our technology management team has selected what they consider the "Top Innovations of 2006". The selection criteria were based on technology and mid-term business impact, as well as merits of creativity and originality.

An innovative manufacturing concept for lean and flexible production is presented in the lead story. Known as Flex-Lean, it allows multiple products to be produced on the same line using a standardized but flexible cell concept. Although designed for the assembly of car bodies, we believe it will also significantly benefit other applications requiring single-line, multiple-product manufacturing.

Collaboration between humans and robots has been a popular theme for countless science fiction writers. Among the most famous robots in print – as well as on the big screen – are R2D2 of "Star Wars", and Asimov's "I, Robot". While some robots try to emulate the R2D2 type, modern day industrial robotics has remained far from these visions, mainly due to human safety reasons, ie, the risk potential of a sudden movement by an active robot is too high. An innovation by ABB called SafeMove will eliminate this danger and allow humans to work side by side with robots.

Within the power industry, the ability to design self-healing electrical networks is a desirable objective. ABB research has now brought this objective a step closer to reality by developing the functional and architectural specifications of the IT infrastructure necessary for supporting such a grid.

The implementation of IEC 61850 as a single and global standard for substation communication is now ubiquitous. It has led to a number of ABB innovations, which are discussed in two articles. The first deals with hollow waveguides for medium-voltage switchgear, which are used to distribute the vast data-flows needed in such equipment. While flexibility is increased, this technology significantly reduces the amount of switchgear wiring needed, making the overall set-up more immune to wiring errors and electromagnetic compatibility issues. Other innovations stemming from the standard (and discussed in the second article) include several plug and play tools for substation automation applications that help alleviate costly project engineering.

The first of a two-part feature on power semiconductor technology concludes the power segment of this issue of ABB Review. As an essential switching technology for power applications, its current status is discussed in part one. Part two, looking into housing design and the future, will be published in our first issue of 2007.

For many of us, classifying colors is not an easy task. However, the measurement task is even more difficult especially when it has to be accomplished on-line in a harsh environment – such as on a paper machine – and at speeds in excess of 100 km/h! Based on standard color definitions we show in a sequence of articles how this complex issue can be dealt with and how advanced control can reduce the use of chemical dyes to the benefit of the customer and the environment.

Cutting giant reels of paper into smaller rolls according to customer specification is not as straightforward as it might seem. To optimize the individual rolls, the cutting algorithm must take into account quality data from on-line sensors resulting in massive data manipulation tasks.

The next two articles deal with economic optimization and asset management in customer implementations.

The industrial segment concludes with the description of a new principle for the on-line measurement of oxygen, an application used in many industrial processes and utility plants.

The right mix of insight and ingenuity counts at the interface between market pull and technology push. For innovation to succeed, a clear understanding of present and future needs, and opportunities must be sought. Highlighting innovations help communicate our ideas to our customers and suppliers. This continuous dialog is vital to the success of all parties.

Enjoy your reading

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