

# Tools and services

Amongst the broad range of tools and services available for risk management, CTRM software, plant condition monitoring systems and actuarial science are three key examples

## CTRM systems

Commodity trading and risk management (CTRM) systems enable trades to be executed and trading positions monitored and recorded, while their risk management functions are designed to give a clear picture of the levels of potential risk those positions represent.

For the risk management parts of its systems, the metals group at major CTRM supplier Brady is mainly focused on price risk management, and particularly market risk. In testing how its CTRM systems will respond in exceptional events, the group looks at what might happen and what the consequences would be for users in assessing the events' impacts.

Value at Risk (VAR) is one tool used to make assessments, within which theoretical models, such as a Monte Carlo simulation or a historical model, can be used.

"We evaluate the consequences, make a full portfolio evaluation and then look at what the user would make or lose in that event. The VAR model enables a huge number of simulations to provide an aggregate view," explains Harry Knott, Brady head of metals.

## What if..?

The CTRM user can choose inputs to answer 'what if..?' questions and to stress-test their position. For example, if the copper price rapidly rises or falls by \$200/tonne, the system answers the basic question: "How will that affect my portfolio?"

CTRM systems become particularly valuable in assessing and managing risk when a complex set of interacting variables needs to be considered. For example, options trading is affected by price and volatility in a non-linear relationship,

so asking the software to provide answers to queries about what will happen over particular ranges of price and/or volatility, and how movements will affect both profit & loss or a hedge position, delivers a picture of whether and when the user will be long or short, and what needs to be done to re-hedge.

For those on the buy side of transactions – potentially using a half-dozen different brokers to spread risk – one big market move might push them into a margin call from a particular broker, with potential knock-on effects for credit and ultimately the market rates they will pay for it. The CTRM system generates reports to enable traders to monitor and control such risks.

## Frequency and type of access

Flexible and quicker access to CTRM data can be provided by web-browser-based screens.

The collection of risks faced by banks or by metal producers and fabricators, hedging by using futures contracts, differ. So does the nature, depth and frequency of information needed.

An options trader undertaking proprietary trading needs live, real-time information constantly updated after every trade. A concentrate trader calculating various escalators at different price levels is more likely to need to make occasional off-line assessments of the effects of planned new contracts, and to consider the hedging adjustments needed as a consequence.

"Options traders will automatically assume that such functionalities will be there, but physical or buy-side traders are less conscious of them as of now. The goal is to have lots of capability from deterministic and risk management functionality," says Knott.

Traditionally, physical trading platforms handled a lot of data on logistics and administration, but they've now come together to provide a 'combined portfolio' of value to both physical and derivative commodity trades, Knott explains.

CTRM systems are good for handling market, credit and liquidity risks. Operational and reputational risks are harder to quantify and measure in a straightforward way, but they hold the potential for catastrophe. "Some systems will help you to quantify those, but I'm a little bit sceptical about them," says Knott.

He explains that while the copper price is an exact number that enables risk to be calculated and hedged very accurately to within half a lot, operational risk is far more nebulous. It could be that even more risk is introduced if calculations are based on numbers attached to risks that are really unknowable.

CTRM systems reduce operational risks by shifting from old-fashioned records kept on spreadsheets where inaccurate data or incorrect contract information might be included – mistakes such as a 'buy' registered as a 'sell' – but left undetected until it is too late to prevent a potential loss arising. Automated reconciliation checks that records match up and that everything is in line, flagging up problems, preventing losses and wasted time.

CTRM systems like Brady's are also equipped to deal with new regulatory requirements such as reporting trades to a central repository under European Market Infrastructure Regulations (EMIR).

Internal management reports can also be generated on demand, but Knott warns that siphoning off data produced by CTRM systems into other unrelated software packages for ERM could only be done with caution, in case they are not in exact alignment with the parameters needed. "Brady's VAR suite of functions is tied in with the other parts of the system," he stresses. "If data are fed into another 'black box', you need to ask what that is achieving."

Brady's stress tests, profit and loss and VAR data all feed into integrated models, he notes. Between them they provide integrated risk management

## P & L report from Brady's CTRM solution



tools for physical traders, producers and people hedging and trading in derivatives. Companies with a number of operations, plants and offices in a range of locations globally can also calculate their aggregated risk by bringing together all their data in one place.

Cloud-based solutions offer access from multiple locations and CTRM 'software as a service' provides users with full system functionality while the provider takes care of the software and any upgrades and updates applied to it.

"Signing in for remote access is something companies are increasingly willing to do," says Knott, "Some don't want to administer systems for themselves." Others prefer still to hold their systems and software on their premises.

Brady supplies systems either way according to their clients' own policies and preferences – and their customers' own due diligence about the respective merits of on-site or remote access regarding data security – Knott explains.

## Plant condition monitoring

To the extent that the smooth running of a company as a whole can be compared with that of efficiently operating all the components of and processes at a steelworks, some parallels can be drawn and basic lessons learnt about managing risk from the technology developed to monitor the condition of a plant's components.

Limiting the risk of a works' failure to perform properly, or worse still unexpectedly stop running altogether, is the aim. For a steel producer, the smooth and efficient running of its works is directly linked to its overall enterprise risk management (ERM) strategy in the sense that unplanned shutdowns have direct consequences for production and profits.

Identification of the most critical components – and an understanding of what happens if they fail – is a crucial analysis for a plant. If it is of a similar design to ones built and run earlier, the experience of its predecessors can be drawn on from failure mode cause and effect analysis (FMCEA). Systematic digital

## The actuarial angle

The Illinois, USA-based Society of Actuaries, defines ERM as a process of coordinated risk management that places a greater emphasis on cooperation between departments to manage an organisation's full range of risks as a whole. It also says that the concept of ERM embodies the perspective that risk analysis cuts across the entire organisation. "The goal of ERM is to better understand the shock resistance of an enterprise to its key risks and to better manage enterprise risk exposure to the level desired by senior management," it states.

Since actuaries specialise in assessing the financial consequences of risk – traditionally in areas such as insurance, pensions and investments – it is not surprising that they have become involved in ERM. An illustration of the solid foundation of this relatively new concept is the development of a professional qualification in this field. The Society of Actuaries has introduced a qualification of CERA: Chartered (or Certified, depending on the signatory body) Enterprise Risk Actuary (or Analyst) which is stated to be a rigorous demonstration of expertise in this area. The qualification is recognised by 15 actuarial member associations in 14 countries. It was inaugurated in August 2007, and over 2,000 have since been awarded.

record-keeping of its own performance for later reference is also useful.

The results highlight which parts of a plant especially merit the installation of condition monitoring sensors – measuring parameters such as torque, flow rate, temperature, power, wear and vibration – to assist in the formulation of regular maintenance checks and schedules, as well as providing alarms if anything out-of-the-ordinary is detected. Avoiding the risk of serious equipment damage due to overloading is another aim.

Crucial parts in a rolling mill, for example, include gears and spindles on particular rolling stands. For a steelworks converter, the tilting drive for the vessel is a particularly critical component since its failure could leave the works crippled with 100 tonnes or more of molten steel stuck inside!

### Traffic lights

Simple warnings for operators when things could, or are about to, go wrong by a simple 'traffic light' system of green for 'okay', yellow for a problem looming and red for 'stop running' have proved effective in condition monitoring systems such as SMS Siemag's 'Genius CM' condition monitoring system. Integrating condition monitoring with a plant's existing automation and control system enables data and trend analysis via web software used in the enterprise network.

The ability to then switch to an 'expert view' providing more data that might result in a local solution is the next step, which is backed up by remote human advice if needed. That support is particularly valuable for an operator working a night shift and/or based in a plant far from local expertise, notes Christoph Häusler, in SMS Siemag's Technical Customer Support department.

Such systems are modular and can often be retrofitted to existing plants. They are well established in Europe and North America, while interest is growing in Brazil and South Africa, says Häusler. SMS Siemag has also supplied condition monitoring systems for several plants in India. The cost of a few hours of unplanned shutdown can exceed the price of installing a condition monitoring system, he notes.

Historically, Chinese steelmakers have been less inclined to install condition monitoring equipment up to now – partly on grounds of cost – but suppliers like SMS Siemag are additionally working on smarter and less expensive basic systems. Häusler sees a future where condition monitoring will increasingly be provided as a service as much as, if not more than, a system.

Expertise is needed to interpret the signals generated by as many as 350 sensors in some condition monitoring systems, which is something that plantmakers such as the SMS group can provide as 'on-going condition monitoring'.