

## Asset Management: concepts & practices

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Many directors & analysts think "Asset Management" is all about corporate mergers & acquisitions, Return on Capital Employed and 'asset stripping'. Others have highjacked the phrase simply to mean 'more professional maintenance', or 'equipment tagging and tracking', or 'asset information & work management software'. The new British Standard, PAS-55, clears the air and defines what a physical asset management system needs to include - but how are UK companies stacking up against this model? OFGEM's Asset Risk Management surveys, UKWIR's Standard Framework and other initiatives are also switching the searchlight on - and the responses have been pretty varied in depth and quality. This article looks at the whole picture, and how we can join up some of the most important pieces.

### ***Competing interpretations and definitions***

Even a fairly superficial survey of uses for the term "Asset Management" reveals some fundamental differences in interpretation and usage. Here are 6 distinct yet common current uses of the term:

1. The **financial services** sector has long used the phrase to describe the management of a stock or investment portfolio – trying to find the best mix of capital security/growth and interest rates/yield.
2. Main board (usually **financial**) **directors** and some city analysts use the term in relation to mergers and acquisitions– buying and selling companies, re-organising them, divesting low value elements and trying to raise capital value and/or yields.
3. **Equipment maintainers** have also adopted the name in an attempt to gain greater credibility and 'voice' for their activities. As 'maintenance' has for so long been treated as a necessary evil and low on the budgeting priority list, perhaps calling it 'Asset Management' instead will raise awareness on the corporate agenda? 'Asset Management' becomes, therefore, a more sellable way of saying 'better and more business-focussed maintenance'. *This is the dominant use of the term in the USA at present.*
4. In line with the maintainers seeking greater corporate clout, the large number of **software vendors** selling 'computerised maintenance management systems' (i.e. asset registers, work management, history gathering, materials & cost databases) - over 300 at the last survey - have relabelled their products as "Enterprise Asset Management Systems".
5. If we dig deeper into the **information systems** world, we even find "Asset Management" interpreted as just the bar-code labelling of computers and peripherals, and the tracking of their location/status.

6. Many **infrastructure** or **plant owners and operators** have adopted ‘Asset Management’ to describe their core role in life – both caring for, and making best sustained use of, physical plant, infrastructure and its associated facilities. *This is the interpretation that the new British Standard, PAS-55 is focussed upon, and is the subject of this article.*

### “Optimisation”

The last definition above constitutes the basis for the significant performance improvement opportunity available to almost every company in every industrial sector. If we broaden the scope to describe not just physical assets, but *any* core, owned elements of significant value to the company (such as good reputation, licenses, workforce capabilities, experience and knowledge, data, intellectual property etc), then the *optimised, integrated* Asset Management represents the sustained best mix of:

- > Asset **care** (i.e. maintenance and risk management)
- and
- > Asset **exploitation** (i.e. *use* of the asset to meet some corporate objective and/or achieve some performance benefit)

Perhaps not surprisingly, this is what the financial services sector uses the term to describe – finding the right combination of asset *value retention* (capital value/security) and *exploitation* (yield) over the required horizon. Like different bank accounts or investment options, physical infrastructure can also be protected and well cared-for, with high capital security (condition) but lower immediate returns (profit), or it can be ‘sweated’ for better short term gains, but at the risk & condition cost of future usefulness/value. Asset Management involves trying to juggle the conflicting objectives – milking the cow today but also caring for it so that it can be milked and/or sold well in the future.

“Optimisation” is the word for the resolution of such trade-off’s and compromise requirements, but few really understand what it means in practice. “Balanced Scorecards”, for example, are nearly always mis-named – there is no ‘balancing’ mechanism in sight! In fact, ‘balance’ is not what we are looking for anyway: balance involves *equality* of impact, pressure or achievement. Optimisation, on the other hand, involves trying to find the most attractive *combination* (sum) of conflicting elements (which may involve lots of cost and very little risk, or *vice versa*, or any other combination - just so long as the net total impact is the best that can be achieved).

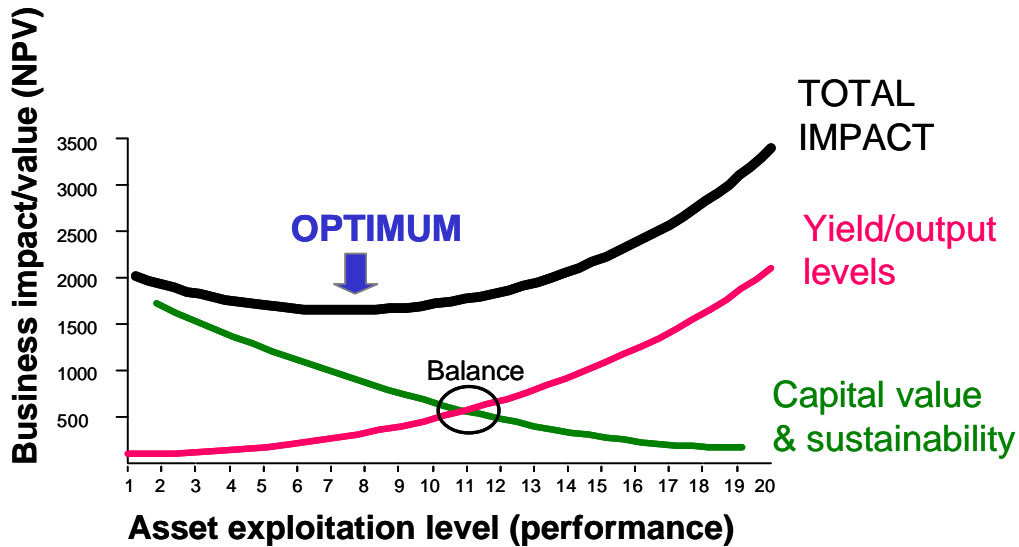


Figure 1. Getting the concepts right first: what is “optimal”?

Of course there are significant challenges in putting numbers to figure 1. The uncertainties about asset behaviour, future requirements, performance values, costs and risks all contribute to make the lines ‘fuzzy’. Furthermore, we tend to organise ourselves into groups of functional specialism so that we do not see the whole picture anyway. Departments are set up to design/build the assets (“engineering”), exploit them (“operations” or “production”), or to care for them (“maintenance”). Only the managing director has the self-interest in optimising the combination – unless “Asset-based Management” has been adopted properly. Organising ourselves by ‘activity type’ may be administratively convenient, but it loses sight of the whole.

### ***The origins of “integrated, optimised Asset Management”***

The term Asset Management would not normally be expected to set many on fire with enthusiastic zeal. It sounds too much like housekeeping and a boring, disciplined ‘ticking of all the boxes’. However, the surge in corporate and regulatory interest for better *optimised, integrated* Asset Management has gathered considerable momentum over the last 15 years. There is certainly a big contrast between merely ‘managing the assets’ (which many companies would feel they have been doing for decades), and the integrated, optimised whole-life management of physical, human, intellectual, reputational, financial and other assets.

The oil & gas sector has had longest to prove what is possible, starting with the wake-up calls of the late 1980’s: the Piper Alpha disaster, oil price crash, Cullen recommendations on risk/safety management, market globalisation and so on. These forced a fundamental reappraisal of the business models – and the recognition that big companies, while holding a number of strategic advantages and economies of scale, were losing the ‘joined-up thinking’ and operational efficiency that smaller organisations naturally enjoy (or need, to survive). So the asset-centred organisation units emerged.

The ‘Asset’ definition differed between interpretations – some set the boundary as the oil/gas reservoir as the starting point, with all associated infrastructure to extract it, others chose physical infrastructure (platforms) in the first place as the units of business or profit centres. The common and vital feature, however, was the recognition that

- > Performance *accountability*
- and
- > Investment/expenditure *responsibility*

needed to be much more closely linked (lie in one pair of hands: the ‘Asset Manager’). So the person/team that had to deliver the output also had full relevant budget decision-making: what is worth spending, when, to achieve/improve/sustain the performance. Any *shared* services or resources had to compete with the open market for the attention and funding of the (asset) budget holders.

My colleague, Tom Brown, former senior Asset Manager with Shell, recognised this breakthrough when the Director of Human Resources approached him to ask ‘what can HR do to help you?’ rather than the traditional instruction style of applied controls and overhead costs. The HR department now only gets paid via the Asset Manager’s budget.

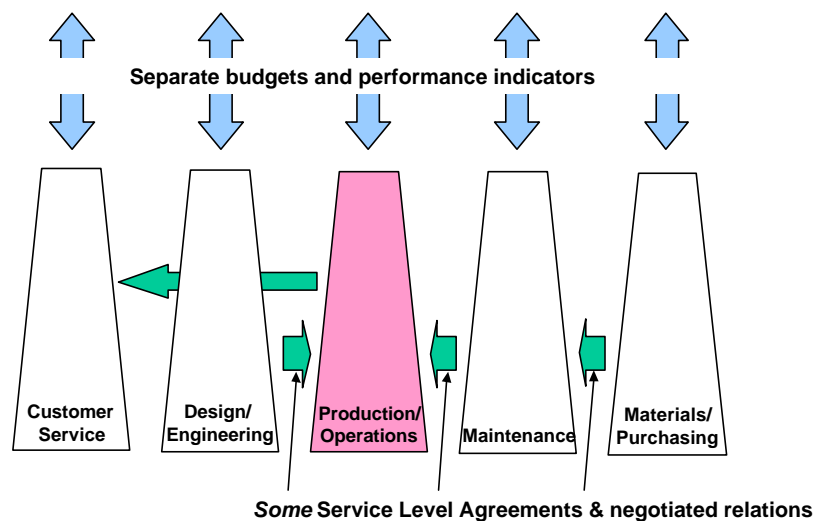


Figure 2. Traditional functional and activity-centred organisation

# Asset-centred organisation

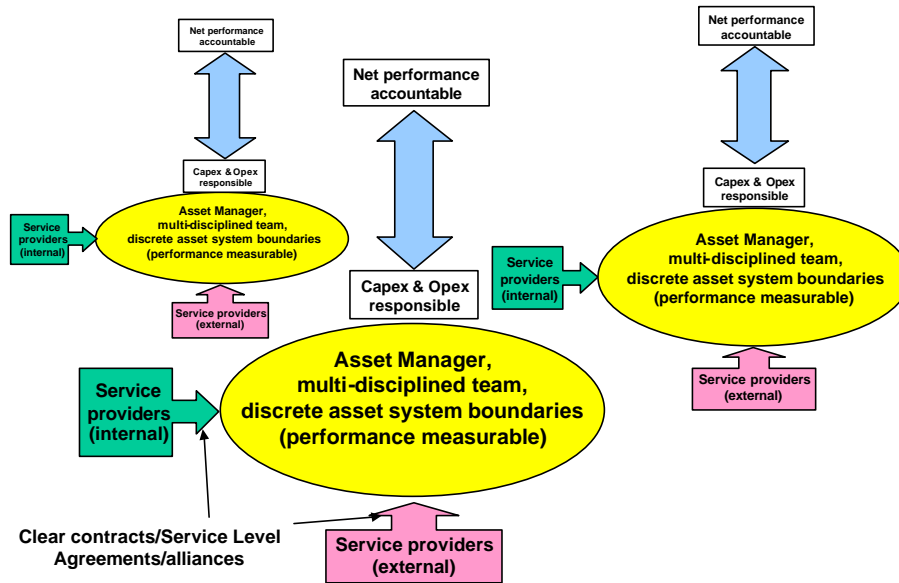


Figure 3. Asset performance-centred organisation

The *consequences* of such a transformation are now a matter of record: BP, for example, was producing oil at around \$15/barrel in the 1980's – now it does so, in more extreme conditions, at greater safety and environmental standards, for just \$2/barrel. Tom generated a 17% increase in total production rates within 4 years at the same time as a 50% total reduction in operating expenditures. Again, this was achieved while significantly increasing asset integrity *and* his team won a national training award during the same period.

## The PAS 55 definition

The new British Standard, PAS 55, endorses the need for primary, performance-accountable asset/business units, with secondary 'horizontal' coordination and efficiency aids through asset type specialisms, common service providers and standards. However, not many infrastructure managers can really claim to have such a structure in place yet!

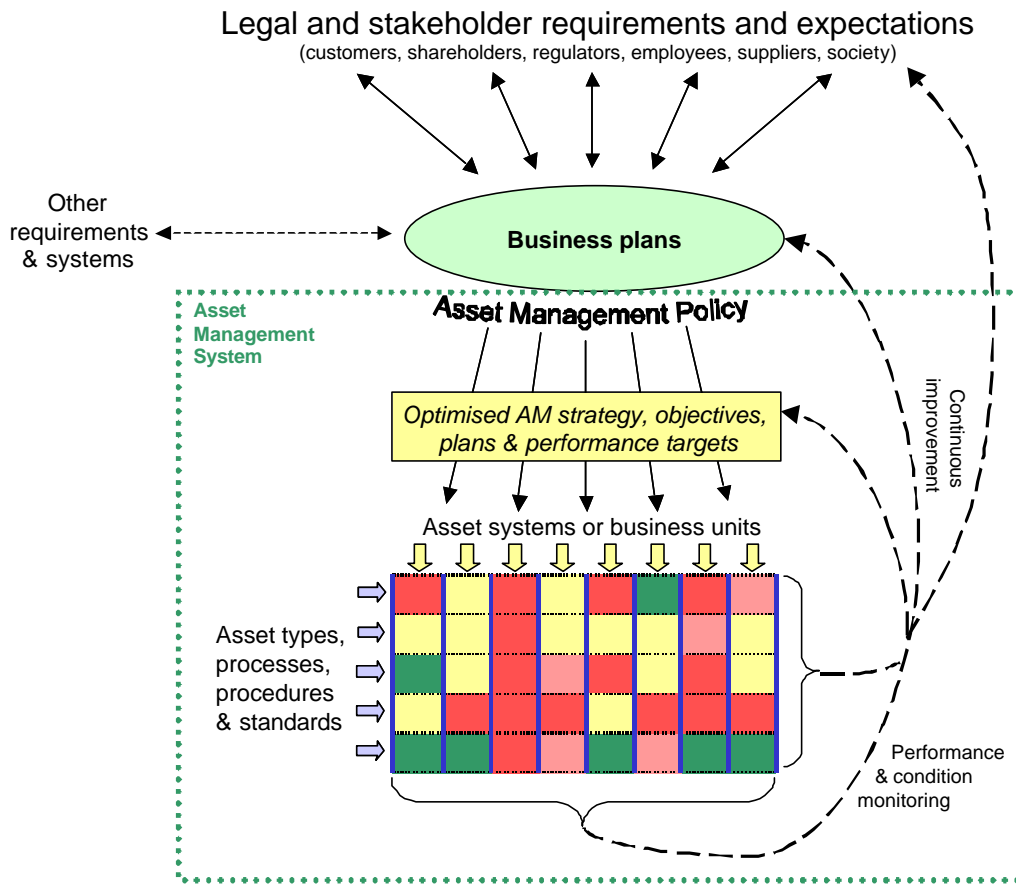


Figure 6. PAS 55 Asset Management System boundaries

In the wider view, PAS 55 defines Asset Management as

*“Systematic & coordinated activities and practices through which an organization optimally manages its physical assets and their associated performance, risks and expenditures over their lifecycles for the purpose of achieving its organizational strategic plan.”*

This sets the goal, but how does a company get there? How do we know, and demonstrate, what is ‘optimal’? How do we coordinate component activities to this goal? How can such a joined-up, whole-life performance responsibility be established? How do we develop the skills, tools and processes to establish and sustain such an environment in the first place?

## ***Function- versus Asset-based Organisation***

Industrial process, manufacturing, utilities and service companies have, over the last 40-50 years developed greater and greater specialisms in activity and niche functions (in the search for better performance). The effect of this has been to create more and narrower silos of contribution – design, construction, operations, maintenance, human resources, finance etc.

Within each silo, performance measures have been developed and these have reinforced localised improvement, often at the expense of the other players (e.g. capital projects recognised as ‘successful’ if they come in under budget and on time, irrespective of opportunities for greater subsequent performance or longevity). The bigger the company, the more this is a problem – hence the recognition in the early 1990’s that a more efficient and effective business model for an oil company is to create ‘mini businesses’ within the total organisation.

Business units, profit centres and other subdivisions are nothing new, of course, but this time there is a significant difference. An asset-centred business unit holds some unique advantages:

- > the boundaries of the ‘asset’ are chosen for clear performance measurability – minimising overlap and shared accountabilities
- > the *multi-disciplined* team managing each unit has the cross-section of skills to draw on the best of each silo (design, engineering, operations, maintenance etc) with the *total/combined impact* as the measure of success
- > their boss, the Asset Manager, has *single point accountability* for the basket of performance and business driver achievements, *and* full budget responsibility for what is needed to deliver them
- > common functions and specialisms, such as laboratories, finance, marketing or major maintenance/projects, are funded by the client Asset Managers, rather than via some separate corporate budget route, treated as indirect and unavoidable overheads.

Such a clear focus creates a ‘fried egg’ view of component, system assets and their shared, supportive services. The service providers within the company (paid-for by their asset ‘clients’) justify their continued existence by either raising the performance of the primary assets, or by policing their conformance with cross-asset obligations (such as regulatory compliance, safety standards etc).

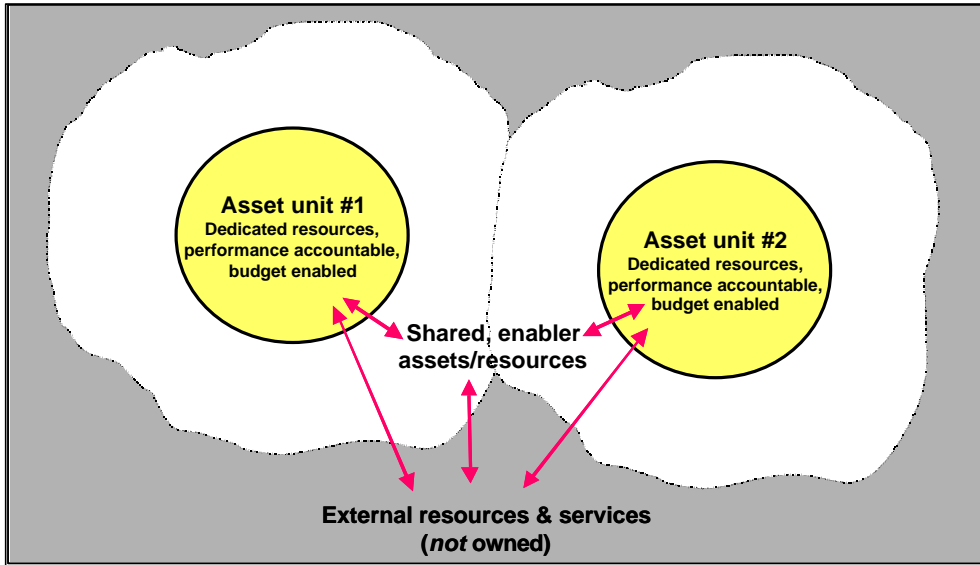


Figure 4. Discrete asset ‘egg yolks’

Of course, ‘linear’ assets are not as simple as discrete location sites, systems or resources. However, the fact that infrastructure is a network of wires, pipes or routes does not fundamentally change the requirement. The unit of performance delivery is still a compound system (of different component asset *types* working together), and the responsibilities for budget assignment need to be targeted in due proportion to the performance contribution that is possible.

So ‘trunk routes’ become the core assets, supported by a number of shared, secondary facilities represented by mesh corners, shared stations or substations, treatment works etc. Shared resources must then either be allocated to the cost base of one of the primary assets (and service level agreements established with the other dependents), or treated as supportive ‘egg white’: i.e. managed separately as a service provider with multiple clients. The egg yolks might be stretched out, but the need for clear definition of yolk/white boundaries remains the same.



Figure 5. Distributed, linear assets (routes)

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However, I believe such a truly asset-centred business model has **not** yet been recognised or adopted in the utilities and transport sectors – most are still thinking in terms of “The Asset” as the entire infrastructure/network and continue to divide responsibilities by asset *type* (e.g. “electrical protection equipment”, “signalling” or “wastewater treatment”) rather than units of performance-boundaried *system* (e.g. “source-to-tap water catchment area” or “primary trunk route”).

At senior management levels, the adoption of an “Asset Management” model has been interpreted to mean a new mix of functional responsibilities (new silos?):

- > Asset ‘Owners’ – dealing with regulators and other stakeholders
- > Asset Managers – decisions on direction and strategy
- > Service Deliverers – work resources & methods.

This does at least emphasise the need for directional thinking (what is worth doing, where, when and why), not just delivery efficiency (doing the same thing quicker, cheaper). And it has stimulated fresh thinking on performance measures and even sustainability (although no-one has really put objective measures on the latter yet). It is certainly is better than the extreme silos of the past.

However, many the key breakthroughs have yet to be achieved – such as the transparent, optimal *combination* of capex, opex, performance and risk. Such as the inverted organisational pyramid to create and harness staff enthusiasm and alignment. Such as the iterative, genuine continuous improvement culture. The big performance prizes being enjoyed by the likes of Shell and BP are still some way off for the utilities and transport infrastructure operators.

Indeed, the post-privatisation utility reorganisations have often been accompanied by regulator-pressured slash-and-burn cost-cutting and downsizing (there was plenty of fat to be removed, but the surgery may have been rather undirected). Few such organisations have put a price on the lost expertise that has resulted, and many are spending fortunes on IT solutions and data acquisition to try and fill the gaps. There is even an image developing (in the USA and elsewhere) that “UK Asset Management is just another excuse for cutting headcount”.

### ***The human factor***

Even a quick comparison between the skills needed to deliver the above, and the typical training or education background of most staff will reveal a major misalignment. How many engineers have sufficient business, financial and communication awareness? Why do we continue to see/treat operators & technicians as (skilled) hands, rather than also having brains and very sophisticated sensors? Ask any BP Asset Manager where most of their improvements have come from and a very clear answer comes back – from the workforce! We hear that “people are our greatest asset”, but often see evidence of the opposite. The disillusionment and scepticism resulting from past, temporary initiatives, ‘spin’ and oscillating management fashions means that there is much credibility to be rebuilt. Just another re-badging exercise is not going to be enough.

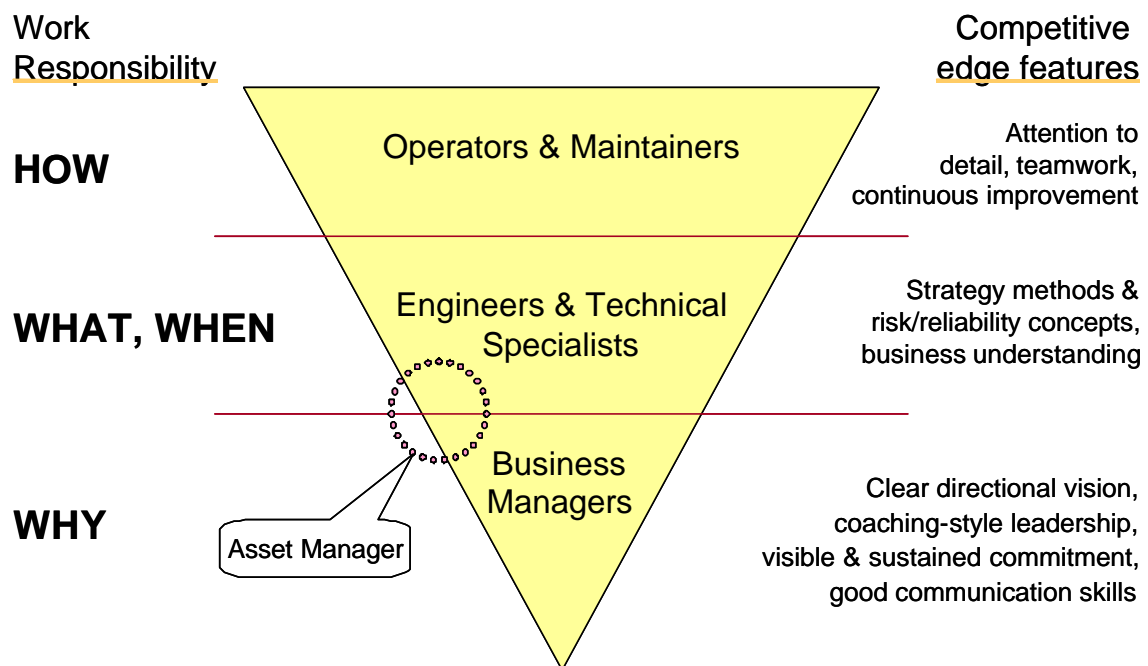


Figure 7. Inverting the pyramid

The gap between current practices and capabilities, and those required to harness everybody's best efforts, is wide. On the education front alone, simple things like 'awareness of the cost of downtime' and 'how the information being collected is going to be used' can transform the motivation, performance and creativity of the operators/technicians. The syllabus of most engineering-related degrees has only a 10-15% relevance to the jobs that most graduate engineers find themselves in.

Senior managers are still too easily 'sold' on the latest 3-letter acronyms, IT 'solutions' and consultancy 'panaceas', without really understanding what they can, *or cannot*, do or deliver. And many still find it difficult to resist operational hands-on involvement ('playing with the train set'), instead of adopting new behaviours in giving directional clarity, protective empowerment, communication and coaching.

### A preliminary AM checklist

Getting the whole jigsaw puzzle sorted out is a major challenge, therefore. We certainly cannot solve all the problems simultaneously. However there are some valuable pointers to the establishment of the right environment, and foundation stones that help to build a robust total structure. The following is a set of observations gained over the last 20 years of working with successful Asset Managers and seeing what seems to be the minimum underlying set of enablers:

- > A clear choice of 'granularity' for defining an asset (not 'the whole company' and not 'the individual pump/motor/transformer'): a level of composite system whose measurable performance boundary is clear, big enough to justify a dedicated, full time Asset Manager and his/her multi-disciplined team (covering relevant, adequate asset exploitation and asset care skills).
- > ALL other functions and occasional resource requirements organised as service providers, funded by their client 'assets' and competing with external alternatives.

- > The ‘umbrella’ image and language (e.g. Asset Management) prominent and consistent in Company, Departmental & Personal objectives, house literature, training plans, stakeholder relationships etc.
- > Lost Opportunity/downtime events are monitored *and costed* – this is where most of the big improvements will come from (rather than further opex cost cutting). Unless and until a price is put on asset *non*-performance, it is impossible to justify or optimise what is worth spending to improve it.
- > Sustained communication on the *objectives*; *why* they are important and *what has/is being achieved so far* (people lose sight of how much improvement has already occurred).
- > Problem/opportunity identification, investigation & solving processes all linked together and part of normal, daily life – *closing the loop* and *realising the benefits!*
- > Natural *cross-functional team-based working style* (including geographic co-location where possible) e.g. engineering, operations & maintenance.
- > Full-time *facilitator(s)* to make the ideas happen – this requires multiskilled communicators and enthusiasts to help corporate ‘dinosaurs’ to evolve, and to work around the ‘saboteurs’ (whose power base is being changed/removed).
- > *Education*: urgently addressing the big gaps and backlog at management, technical and workforce levels.
- > *Directional tools & disciplines* for renewals, changes, maintenance, inspection, spares and other risk-based decisions: decision-support is *not* just the better/greater provision of data & information about the assets.
- > *Administration tools* for collecting/storing asset data, work control, resource control, project and financial management: avoid the “tail wagging the dog” either in overly prescriptive and expensive control systems, or in capture of data that is not really needed and will not be used.
- > *Twin track* corporate planning: this year’s “quick wins” are visibly used to pay for sustained commitment to the larger goal - typically 3-5 years away, to benefit from behavioural changes. This is a self-adaptive, cumulative improvement path, and contrasts greatly with strategies based on typical benchmarking, audits and ‘blue skies visioning’ (which tend to generate an intimidating wish-list without the business-case prioritisation, linkages and flexibilities).

### ***Top-down alignment of objectives***

To sort out the picture, greater understanding of the Asset Management business model is certainly needed at board level and in regulatory circles. Separation into ‘Asset Owner’, ‘Asset Manager’ and ‘Service Provider’ roles is not enough – a good start, but not enough. Greater risk awareness and the better targeting of capital investment are not enough. A top-down clarity of the conflicting business drivers, their relative and absolute significance or criticality, and optimisation or trade-off mechanisms are needed. The Balanced Scorecard must be appropriately calibrated – with real money values placed on the various conflicting performance attributes (that’s why money was invented in the first place - to ascribe appropriate value to dissimilar commodities so that they could be traded). Until there is a calibration

mechanism, it is impossible to demonstrate that, for example, sacrificing 20% of the innovation ‘score’ (such as reduced R&D activity) might be worthwhile to prop up this year’s financial results (or *vice versa*). This goes for all the conflicting business drivers (safety, environment performance, profit, regulatory compliance, social responsibility etc).

**Bottom-up delivery**

There is real excitement and evidence of change in the hands-on levels of Asset Management. The weapons, understanding, methodologies and clarity of purpose are all evolving fast. RCM, TPM, Root Cause Analysis, Condition Based Maintenance, CMMS/EAM information and work management systems etc. are all part of the basic toolkit now. In particular there is an awakening to the need for business focus in place of technical or operational jargon, and the bottom-up cost/risk/ performance evaluation of individual activities (not just the top-down budget setting of the past).

The MACRO project<sup>1</sup>, for example, rated as one of the most successful DTI-backed collaboration programmes in the last 20 years, has yielded spectacular results in Asset Management decision-making. One manufacturing company has just reduced their annual downtime by 50%, another (international valve stockist) has reduced inventory by 60% (with *improved* service levels) and the *average* reductions in maintenance costs have been 25-45%, usually accompanied by 5-20% increases in system performance/availability.

One multinational company, that now mandates that *every* asset management/investment decision must go through the MACRO discipline/process, is quoting a doubling of shutdown intervals, a rise from 89% to 97% in system availability, and *sustainable* annual maintenance costs of just 0.6% of capital value. Last year they did 100 studies on one site alone, yielding \$50million/yr net improvements (and 80% of conclusions are already implemented).

Methodology	ANALISES			TOTAL IMPACT (\$K/year)	
	PLANNED FOR 2002	COMPLETED (1st 6 months)	IN PROGRESS at July 2002	VISUALISED 2002	ACHIEVED AT JULY 2002
CRITICALITY ANALYSIS	6	1	9	-	-
LOST OPPORTUNITY ANALYSIS	3	-	3	-	-
CROSS-FUNCTIONAL TEAMS BUILD	1	1	3	4865	350
ROOT CAUSE ANALYSIS	16	1	9	13890	1100
STATISTICAL DISTRIBUTION ANALYSIS		1	-	-	-
RELIABILITY CENTRED MAINTENANCE	14	1	12	888	5269
RISK BASED INSPECTION	7	1	2	600	-
COST/RISK OPTIMISATION (APT)	10	8	9	950	15140
OPERATIONAL IMPROVEMENTS	13	1	10	780	1500
NEW TECHNOLOGY APPLICATIONS	11	1	9	1480	176
SYSTEMS RELIABILITY ENGINEERING	4	1	5	1500	457
	<b>85</b>	<b>17</b>	<b>71</b>	<b>24,953</b>	<b>23,99</b>

Figure 8. Sample of the range & impact of ‘bottom-up’ activities in an Asset Management environment (process industry; c.1400 persons trained, 3-9 days each, over 3 year period)

<sup>1</sup> See MACRO pages at [www.twpl.co.uk](http://www.twpl.co.uk) and [www.aptools.co.uk](http://www.aptools.co.uk)

### **Meeting in the middle**

The real test of integrated, optimised Asset Management is when the top-down managerial expectations, budget-setting and performance targets, and the bottom-up capabilities, opportunities and prioritisation are lined up and transparently linked. This is where the lubrication and human issues become so important (*every* company that has really established a successful asset-centred performance leap says that this turned out to be the critical bit). The tools and techniques, reorganisations and performance measures all *help to make things possible*, but ultimately it is *people that make them happen*. So, in conclusion, the hearts, minds and collaborations are where good Asset Management lies: don't stint on **education, communication and cross-functional teamwork!**

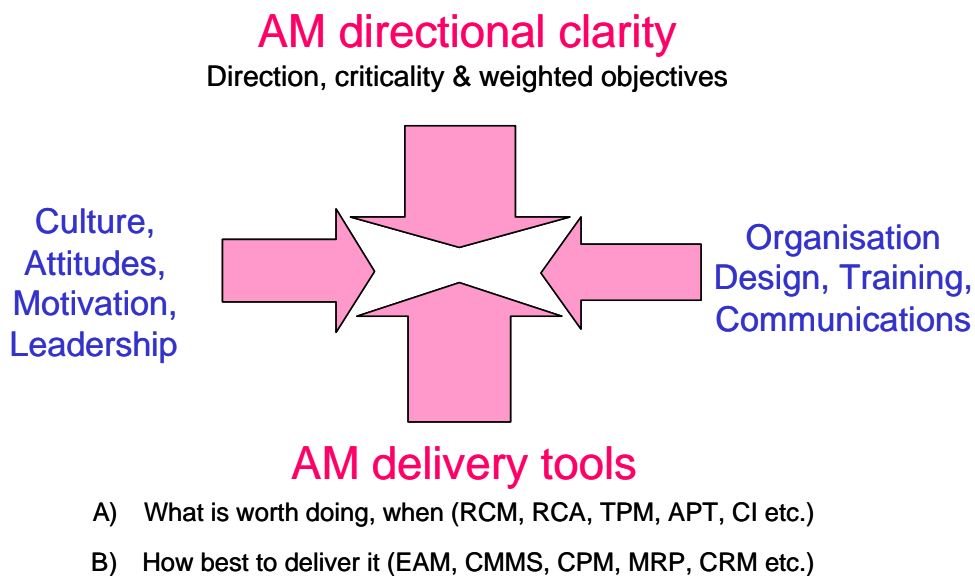


Figure 8. **Top-down, bottom-up & middle-lubricated.**

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