June 2020

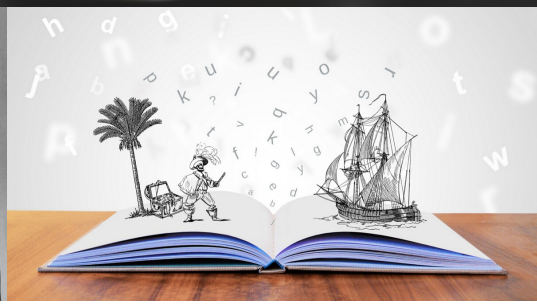
Issue 02

Project Engineering Management Ltd

ENGINEERING PERSPECTIVES

Today's trending topics in engineering

Monthly newsletter



TRENDING - DIGITAL STRATEGY IS CHANGING

Each month, we will discuss a theme that is trending in the engineering world.

This month, our thoughts on how industry needs to reassess a digital strategy in these ever changing times.

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Q&A - WITH ANDY SIMPSON

Q&A session with industry innovators and influencers.

Andy talks about 3D printing, how it is influencing manufacturing and the benefits that will result.

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GUEST POST STUART MARTIN

Stuart gives us his thoughts on the importance of Design Management in new build projects after more than 30 years of project management and engineering experience in the energy sector.

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A GUIDE TO ADDITIVE MANUFACTURING (3D PRINTING)

PEM Ltd Virtual Training Solutions

2 x 90mins online sessions
1st, 8th July 9:30 - 11:00

Hosted by: Institution of MECHANICAL ENGINEERS

DIGITAL STRATEGY IS CHANGING

by Matthew Laskaj, Company Director - Project Engineering Management Ltd.

The Digital Revolution, or Industry 4.0, has changed everything. Google will answer any question you have, YouTube will teach you anything you want to know, social media connects you to anyone you want to know, e-commerce lets you sell anywhere – information is free and instantly connectable. The question to you is – how will you use it to add value to your business?

Now more than ever, we need to reassess our digital strategy. Some of the most successful entrepreneurs are kids running a business from their living room using a webcam, phone and a laptop to reach thousands daily. Why are they so successful? It isn't because they have better technology, and they definitely don't cater for a wide target audience. They are doing business differently to the way it used to be.

This has become the new factory. In essence, they have developed a strategy and assessed their target audience needs. Using their skills, they have selected some technology to achieve their ambition which is to get their message across. It just so happens that the technology doesn't need to be as sophisticated as you might think, and they aren't the best in the world at using it. Their success is based on the innovative strategy and skills at their disposal. And it is working.

Organisations of all sizes can now deliver high value (high quality, low cost) products to anywhere in the world. All you need to do is develop a strategy that gives your user the value they need, by working to your team's skillset, adapting the culture to suit and utilising the most appropriate technology to fulfil that need.

Industry 4.0, new technologies such as digital platforms also open up completely new possibilities for engineering. Although these increase the efficiency of existing systems, machine designers see their business threatened.

Digitalisation is already changing the production of goods and devices of all kinds today and will do so much more in the future. Intelligent machines and robots are able to communicate with each other through the Internet of Things (IoT) and control and monitor production processes autonomously.

Does this mean humans will no longer be needed in the future? Quite the opposite. It just means that the role of the engineer will be changing. I believe that a golden era is dawning for mechanical engineering, because the need for intelligent systems is on the increase to not only replace, but also to work alongside human labour. We can replace labour but we can't replace the creativity and
innovation a human brings (yet).

However, digitalisation can also have a downside. Many industry executives believe that the start of a disruption is imminent and fear that their established business model will fail. Digitisation and networking lead to technical possibilities that are not even thought of today. Digital tools can enormously increase the efficiency of new and existing plants, ensuring sustainability, to which each individual will be increasingly forced towards in the future.

If the same or even higher output is possible with fewer systems, machine builders will have to fear for their current business model. For them, digitisation is accompanied by a loss of sales. The industry is therefore on the verge of disruption. Developing innovations is becoming increasingly important.

Technology can be expensive, and a liability if you lack the strategy to drive the decision. It isn't the technology that will make you money, it is the idea and the message. The digital world is evolving and requires a new thinking from the leadership team. Digital technology can only help you if you have the right strategy to begin with. Otherwise, it just becomes another expensive toy.

Q&A WITH ....

Andy Simpson,
Company Director -
Angus 3D Solutions.

This interview is taken from our recent webcast.

To see the full video interview, go to our YouTube channel in the link below.

1. What do you clean most – your house, office, car?

It is definitely the office. Being a bit quieter we can clear up some of the 'to do' lists that we have been putting off. But in my younger days, it would be the car.

2.Additive manufacturing has been around since the 1980's but has only taken off in the early 2000's. Why did you decide to start up an additive manufacturing business?

Starting up any business in a recession is not an easy decision. My background for the last 40 years has been manufacturing. It would have been easier and more logical to start a traditional machine shop, but there are already so many other good ones. In a previous job, I was going to start up additive manufacturing but the downturn caused them to cancel those plans. So I took control of my own destiny and started my own business to offer something different. Scotland is a little bit behind England and Europe in additive manufacturing so there is an opportunity for growth. I wanted to encourage more manufacturing in Scotland.

3. How can additive manufacturing benefit the industries that lie between small plastic parts and high tech parts like F1?

These are 2 extremes. Cheap and cheerful has it's place which is great and in the early days, peoples expectations were probably higher than what they could print. This resulted in some bad press. As the technology has improved, materials and standards have also improved and people are taking it more seriously.

By more people taking this end of the market up, it gives them an introduction into the technology and they can start developing more for the industrial side. Engineers then get around this and think, ok, we can work with this and it fuels the creativity.

The other extreme I call the 'sexy industry' - F1, aerospace, automotive. People think that if they aren't in these industries, the technology isn't for them. But that's wrong. These industries have engaged quickly and invested heavily so processes have been developed for them.

General manufacturing can benefit - it is another tool in the toolbox. It should be used to support traditional manufacturing as well. Getting concepts and prototypes with AM, your designs are better when you move on to traditional techniques and there are less issues. Also jigs, tooling and fixtures can be produced very quickly and tend to be cheaper. A lot of machine shops are bringing in 3D printing just to support traditional methods.

4. How has COVID-19 changed additive manufacturing perceptions?

The shields can be injection moulded - this is the cheapest method and meets the standards. Companies started 3D printing the shields purely to get instant capacity. Components could be produced very quickly from day 1 while the injection moulding moulds were getting manufactured. There would be a lag for this so AM filled this gap.

5. Some of the parts for visors have not been suitable for use. Is there a limit on the quality of what a print can produce?

That is one of the risks with the technology and the expectations of what can be achieved. Just because you can print it doesn't mean you should. We spoke to thte Government and they have strict standards on the quality of the visors. Unfortunately some other manufacturers visors have not passed and have had to be shipped to other countries and not used in the UK due to these local standards being very strict.

It comes down to the level of the technology on the machine. They have additional parameters and specially developed materials.

To see the full intereview, visit our YouTube Channel in the link below.

ANGUS 3D SOLUTIONS

"THE IMPORTANCE OF DESIGN MANAGEMENT IN NEW BUILD PROJECTS

Written by Stuart Martin, Project Management and Engineering Director

Over 3 decades spent in the offshore energy sector in various project and engineering management roles I have grown to understand that unless the most rigorous design management principles are applied to new build asset, equipment or systems, the end result will be much less than optimum for the contractor and the client. We have apposite industry acronym for the undesired outcome, "FUBAR". This paper is not intended to be a treatise on perfect design management, rather a series of tips, following the project life cycle that have served me well..

Contractors design management strategy:

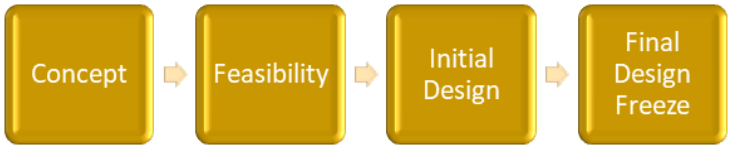
The starting point for design management is the contractor's accurate interpretation of the client technical demands and ability to deliver same in the form of a detailed specification and budget cost. It is axiomatic that the appropriate time to do this is within the tender process and not post award. Early engagement of the design team is essential to the business case, and subsequent tender (cost, schedule, performance and quality) being issued. Team buy-in to the final design approval is critical to avoid costly re-work and managers who are not strong enough to steer all stakeholders on a singular path should not be considered.

In my experience, client's oil and gas operators are conservative generally conservative toward new technology adoption; "queuing up to be second syndrome". The key takeaway here is that, where possible, try to develop and advance existing proven designs as opposed to radical new developments for greater acceptance.

Design stages:

Stage gate models are normally deployed through the design stage. In the most basic form this will consist of 4 stages, but can be more complex and multi-layered.

In essence the stages are, in sequence:



1. Concept – often described as brain-storming, this process considers all the options which will meet the performance specification issued by the client. These concepts are the short on detail, but robust enough to be costed. Ideally, they should be congruent with corporate strategy.
2. Feasibility – this stage is often the most confrontational and testing for stakeholders as it encompasses the marrying of interfaces within scheduling, costing, discipline engineering. quality considerations, safety implications and resource availability to name but a few. The desired outcome is a chosen and wholly adopted single design.
3. Initial design – This stage is when the design concept will be "worked-up "and be capable of robust challenge in terms of form, functionality and economics. A positive decision on these key parameters will allow the design to progress to stage
4. Final design freeze – a work breakdown structure is developed such that individual components are designed and cross-referenced to provide an output which meets the original client specification and provides the contractor with a credible set of internal deliverables.

Lessons learned in design management:

The vital lessons I have learned in design management are summarised below:

- Client engagement in the design process can lead to "scope creep "
- Effective interface control is vital to project success
- The earlier a design freeze can be attained the better for all stakeholders
- Manufacturing and constructability reviews should be addressed in the concept phase
- Be aware and manage carefully, the cultural and mind-set differences between designers, manufacturers and users. Attrition the by-product of incongruent teams.