



Future Foundry - addressing the skills shortages for tomorrow's casting industry

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& Professional Development

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Who am I?

- Degree in Metallurgy – BSc Hons, PhD in fatigue
- CEO of the Cast Metals Federation
- Trade Association for the UK Castings Industry – representing and supporting foundries in the UK.
- Our Members are companies in the UK castings industry - Foundries and some suppliers
- 85% of UK production in membership
- Company Secretary for the EICF – European Investment Casters' Federation
- Chair - ISO TC 25 - cast irons and pig irons

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Trade Association for the UK Castings Industry

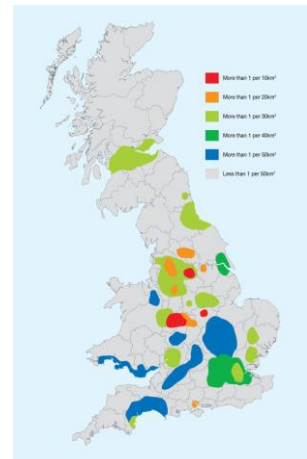
- Foundry (and supplier) members
- Membership is **voluntary**
- All metals
- All processes



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UK Foundry Industry – Fact & Figures

- Around 440 foundries
 - A few large groups and many family owned businesses
 - Strong and growing Investment casting sector
 - Very strong and busy high pressure casting sector
- Geographic concentration in Central UK
- Estimated output of 525k tonnes per annum
- £2.2Bn output value per year
 - Producing high value parts
 - Ever increasing automotive sector
- Employing around 20,000 employees



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What are the challenges?

- Ageing workforce
- No foundry specific training
- No college or university training and education
- Difficulties in attracting young people
- More automation and robotics – greater need for technicians.

*Historically the UK industry had contracted.
So no need to invest in new people – we
recycled our skilled/qualified staff.*

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UK Government

- Apprenticeship levy – tax on businesses with a payroll of >£3M (at 0.5% of TO) - *NEW*
- Employer-led standards for apprentices – competence based with employers involved in assessment - *NEW*
- Very challenging for employers



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What is the issue?

Indeed is there an issue?

- *If yes, what can we do?*

2018 WFO Global Foundry Report:

11 nations specifically referred to skills shortages and/or recruitment as a challenge to the industry.

- Reports of skills shortages at a National (UK), European (CAEF – European Foundry Association) and World (WFO) level.
- Training is patchy – some countries have very robust and well-supported programmes but there are no international standards or benchmarks, little collaboration.
- Image of the industry is poor in general – 3Ds - **Dark, Dirty and Dangerous**
- Strong competition for personnel from other sectors

WFO GLOBAL FOUNDRY REPORT 2018

ACTUAL SITUATION OF THE WORLDWIDE CASTING
INDUSTRY



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Issue is not unique to the foundry sector

UK Information from the Engineering Sector*:



“There is a considerable shortage of appropriately skilled workers in the engineering sector. The top drivers [...] include strong competition for skilled candidates, a shortage of applicants with appropriate qualifications and a lack of awareness among young people of the educational routes into an engineering occupation.”

“our analysis projects an annual demand for 124,000 engineers and technicians with core engineering skills [...] alongside an additional requirement for 79,000 “related” roles requiring a mixed application of engineering knowledge and skills.”

“we estimate there to be a shortfall of between 37,000 and 59,000 in meeting the annual demand for core engineering roles requiring level 3+ skills.”

* Source: Engineering UK Report 2018, pub EngineeringUK, 2019.

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What about the impact of automation?

“The expected **global decline** in total Manufacturing and Production roles is driven by labour-substituting technologies such as **additive manufacturing** and **3D printing** as much as by more resource-efficient sustainable product use, lower demand growth in ageing societies and threats to global supply chains due to geopolitical volatility”.

*“Conversely, 3D printing, resource-efficient sustainable production and robotics are all seen as **strong drivers of employment growth in [...] Engineering [...] and fast-growing need for skilled technicians and specialists to create and manage advanced and automated production systems. [...] expected to lead to a transformation of manufacturing into a highly sophisticated sector where high-skilled engineers are in strong demand to make the industrial Internet of Things a reality”.***

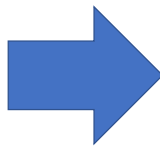
“Increased manufacturing demand for advanced materials and [...] favourable expectations around robotics, pointing to [...] potential for **labour-complementing productivity enhancement rather than pure job replacement.**”

Source: World Economic Forum, <http://reports.weforum.org/future-of-jobs-2016/employment-trends/>, accessed July 2019

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Industry Trends?

More challenging materials
 More challenging applications
 Greater automation
 Increased use of technology
 Increased productivity
 Right first time
 Faster turnaround
 More prototyping
 More innovation
 Greater sustainability & resource efficiency
 Increased environmental controls



De-skilling of routine tasks
 Replacement of un-skilled tasks

Higher skills and more knowledge & understanding

So:

- More technicians
- More engineers
- More innovators

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What would help?

What can the WFO do?

WFO has a number of Working Groups, WGs, tasked with looking at common issues and coming up with ideas:

Training and Professional Development WG

Need to:

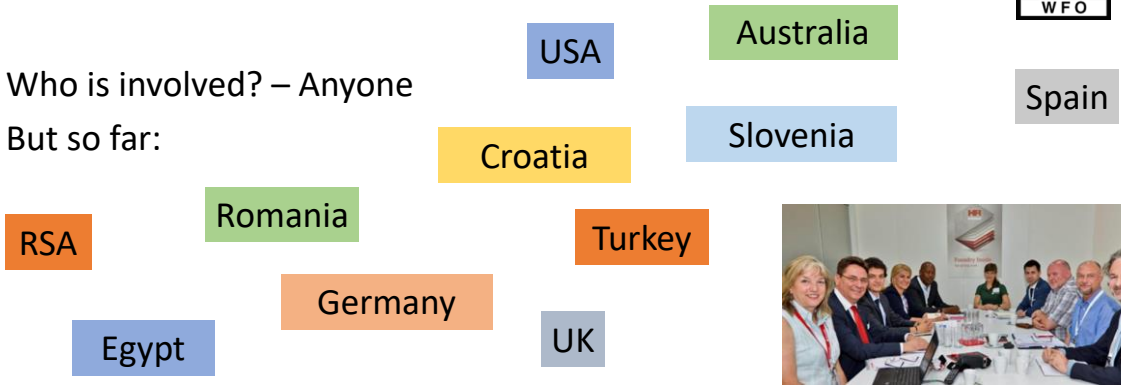
- increase recruitment of new employees.
- educate and train those we recruit – upskill / retrain.
- increase return on investment - retain those we recruit & train.

Technicians and skilled craftspeople, as well engineers and graduates.



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Training and Professional Development WG – constitution



Particular issue for those countries with smaller industries – due to a lack of resources to invest in developing programmes plus critical mass.

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Working Group Aims

- To provide benchmarking of current provision in **foundry specific** education and training to assist the national foundry bodies support their members and foundries in raising knowledge and understanding of foundry processes and foundry technology.
- Develop database and provide sign-posting through WFO website for full and part-time foundry specific education and training programmes that are available with indicative qualification levels, target group and guided learning hours, provider and delivery language (ref FEANI).
- To facilitate collaboration and partnership for the development of training programmes by national foundry bodies that are relevant and current
- To support the national foundry bodies in promoting careers in the castings industry and increase visibility of the industry.

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What it is not!

- No development of new programmes
- No management or H&S courses
- No quality assurance or validation
- Yes – All processes
- Yes – Sharing of information
- Yes – Sharing of resources

Not seeking to raise revenue

Not competing with existing provision

Achievable

Relevant

Opportunity to :

- ? Promote what Member Associations already offer*
- ? Find what your members need and add value*

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Summary of Aims

Benchmarking (?) of current provision – Survey: what is there?
Results - signposting through WFO – via database & publish information



Facilitate collaboration – fill gaps.

IMPORTANT - *not* to develop new training programmes

Plus

Support promotion of careers in foundry/casting industry



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Survey

Phases:

- Planning - *done*
- Letter to each WFO member - *done*
- Outline methodology - *done*
- Trial the survey - *done*
- Survey – send out and chase - *done*
- Analyse and report – *on-going*
- Dissemination – *to do*



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	An example of foundry roles this training level might support
Level 1	Foundry Operative, Labourer, Mould/Core Maker (Unskilled)
Level 2	Furnaceman (Semi Skilled), Inspector (Basic Skills), Lab Technician, Pattern/Moulder/Core Maker (Semi Skilled)
Level 3	Caster, Chargehand, Furnacemen, Moulder/Coremaker (Skilled), Patternmaker (Skilled), Metallurgist (Semi-Skilled), Team Leader, Technician (CAD, Quality, Sand, Laboratory, Methods, Maintenance)
Level 4	Maintenance Engineer, Meltshop/Foundry Supervisor, Tooling/Casting Design Technician, Welder (coded)
Level 5	Automation Engineer, Design Engineer, H & S Manager, Production planner
Level 6	Automation/Process/Production/Quality Engineer, Foundry Manager, Metallurgist (skilled), Researcher
Level 7	Director/Senior Manager
Level 8	Director

Survey – Planning and Design

Benchmarking – Use of European Qualifications Framework, EQF

Definitions of:

- Knowledge – theoretical, factual
- Skills – cognitive and practical
- Competence – responsibility and autonomy

Focus on levels 3 to 7

Glossary of terms

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Responses, to date

Country	Level 3	Level 4	Level 5	Level 6	Level 7
Australia	X	X			
Czech Republic	X	X	X	X	X
France	X	X	X	X	X
Japan	X	X	X	X	X
Korea	X	X			
Poland	X	X		X	X
South Africa	X	X			
Sweden					X
Turkey	X	X	X	X	X
UK	X				
USA	X	X	X	X	

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Examples



E-cast – CLLEFE (Concept in Lifelong Education for Foundry Employees

On-line short courses in HPDC - basic and advanced – now being trialled.

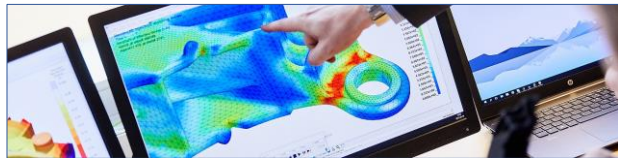


EIT RawMaterials is supported by the EIT, a body of the European Union

Foundry Masters – one to two year

Product Development - casting

In English – via distance learning



The Die Cast Training Network – on-line short courses – various levels

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What next? Sharing Results & Signposting

Options

1. Full interactive and searchable database – key words!!
2. Simple search by level – with direct link to provider
3. Downloadable document....

Consider who would want to use the information, and how – easy, clear, navigable?



First steps

- Distance learning provision
- Delivery in English
- By topic and level – technician, operator, etc
- On the WFO website with notices to Member Associations

Look out for updates



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Support promotion of careers in foundry/casting industry

This is our problem – we need to find the solution!

- Improving the workplace
- Improving the image of the industry
- Showcasing career opportunities in the industry
- Sharing good practice
- Sharing resources – avoiding duplication of effort



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Sharing Good Practice

Five Tribes: Personalising Engineering Education - study and report published by IMechE*
(Five broad categories (Tribes) of adolescent attitudes to STEM).

“‘I’m an engineer... be like me!’ [...] may not be sufficient to persuade those who simply are not ‘like me’.”

“The messages focusing on what pure scientists and engineers ‘do’ are NOT sufficient to persuade the under-represented groups. Careers from STEM need to be described in terms of the personal characteristics required.”

“Lack of confidence is a significant factor for one of the ‘tribes’”

‘... allow each young person to see the connection between their individual capabilities, interests and values; and future career opportunities’

* Source: <https://www.imeche.org/policy-and-press/reports/detail/five-tribes-personalising-engineering-education>

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Careers in the foundry/casting industry

Clean up our foundries

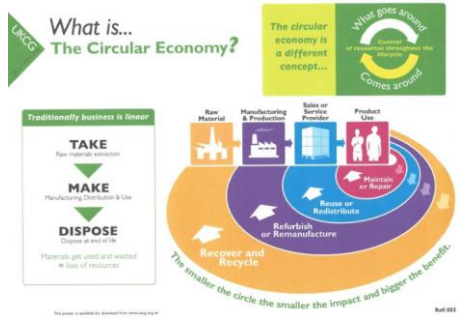
Generate a positive image – and then communicate it

Focus on contribution to modern society eg:

- circular economy - re-cycling and re-use of scrap metal

Good jobs

- well-paid careers with leadership opportunities
- global industry
- interesting and innovative - problem solving, teamwork, making a difference.

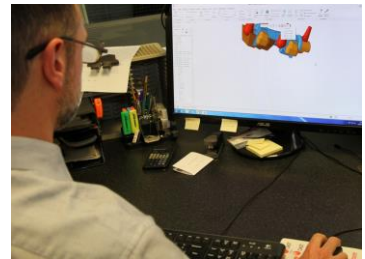


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Support promotion of careers in foundry/casting industry

Improving the image of the industry

- relevance – castings in the world case studies
- environmental contribution eg. e-mobility, wind/tidal energy, water pumps



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Careers in foundry/casting industry

Lots of good ideas and good initiatives

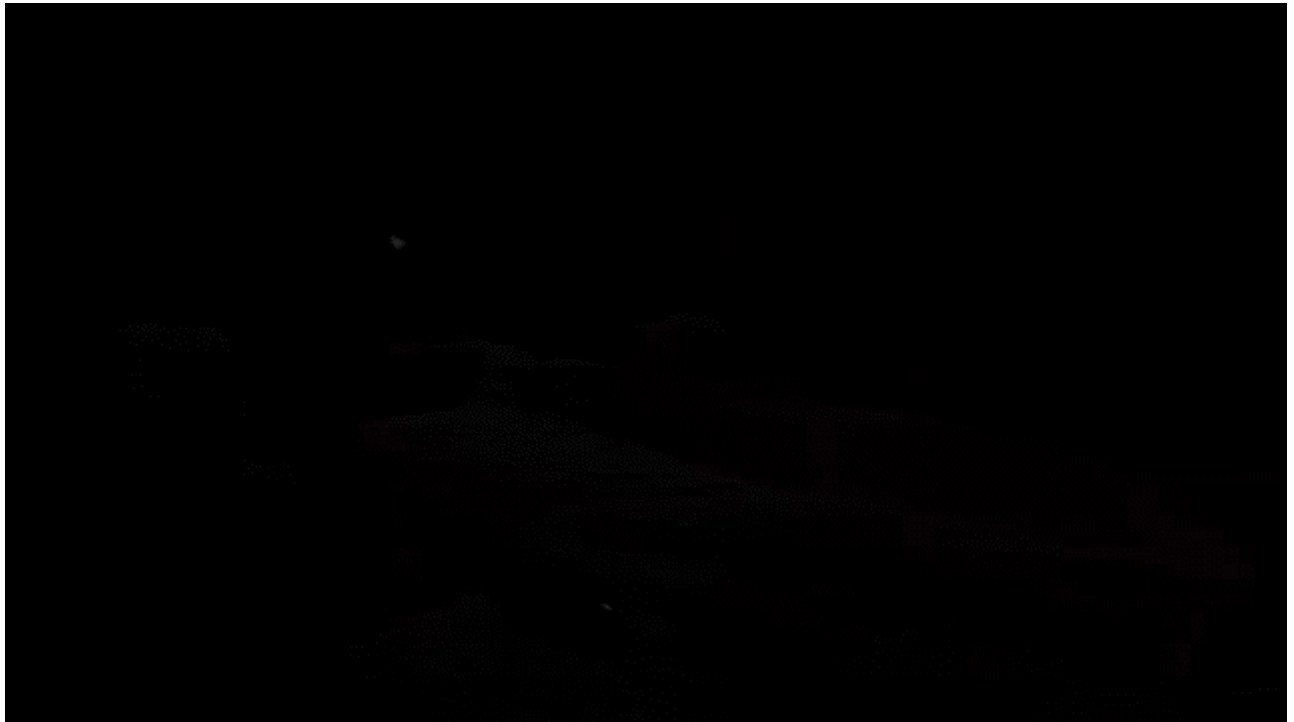
Practical resources to use in schools, eg:

- AFS, USA – Foundry in a Box – supported by FEF
- BDG, Germany – YouCast – magazine. Plus casting kit for use in schools & colleges
- ICME – **Casting the Future Foundry Kit** – and videos
<https://www.youtube.com/watch?v=oVZoYYuYrpY>
- BDG – ‘We are German Foundries’ - video
- Assofond, Italy - Foundry environmental credentials – video

See CAEF website: www.caef.eu – picture & video library



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Institute of Cast Metals Engineers, ICME

Professional body for the industry & WFO Member



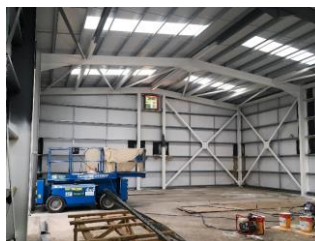
- Diploma in Casting - typically 30 students per year at various locations – technician level
- Short courses - Numerous specialist one and two-day courses, to promote core skills & development
- Continuing Professional Development



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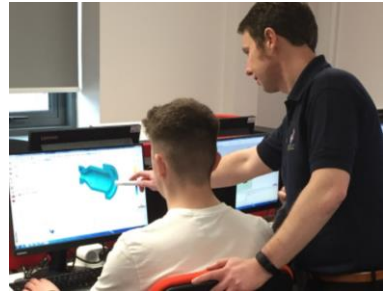
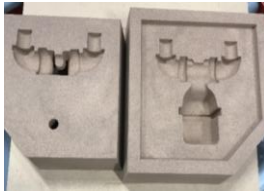
New National Foundry Training Centre



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The first cohort



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BEST OF BRITISH CASTING

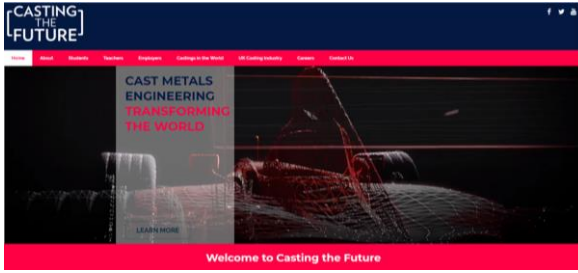


Awards events – showcasing success
Case Studies – promoting casting

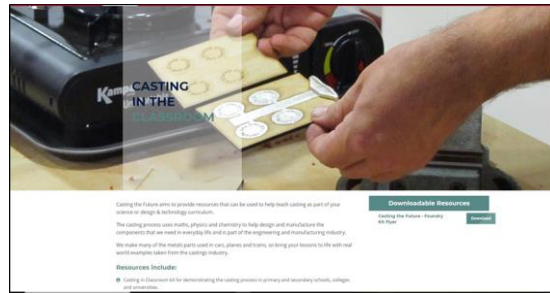
Positive Messages – relevance, circular economy, recycling.....



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**[CASTING
THE
FUTURE]**



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Casting the Future Foundry Kit –
 Transportable 'Foundry in a Box' kit for use in schools, with teacher pack.

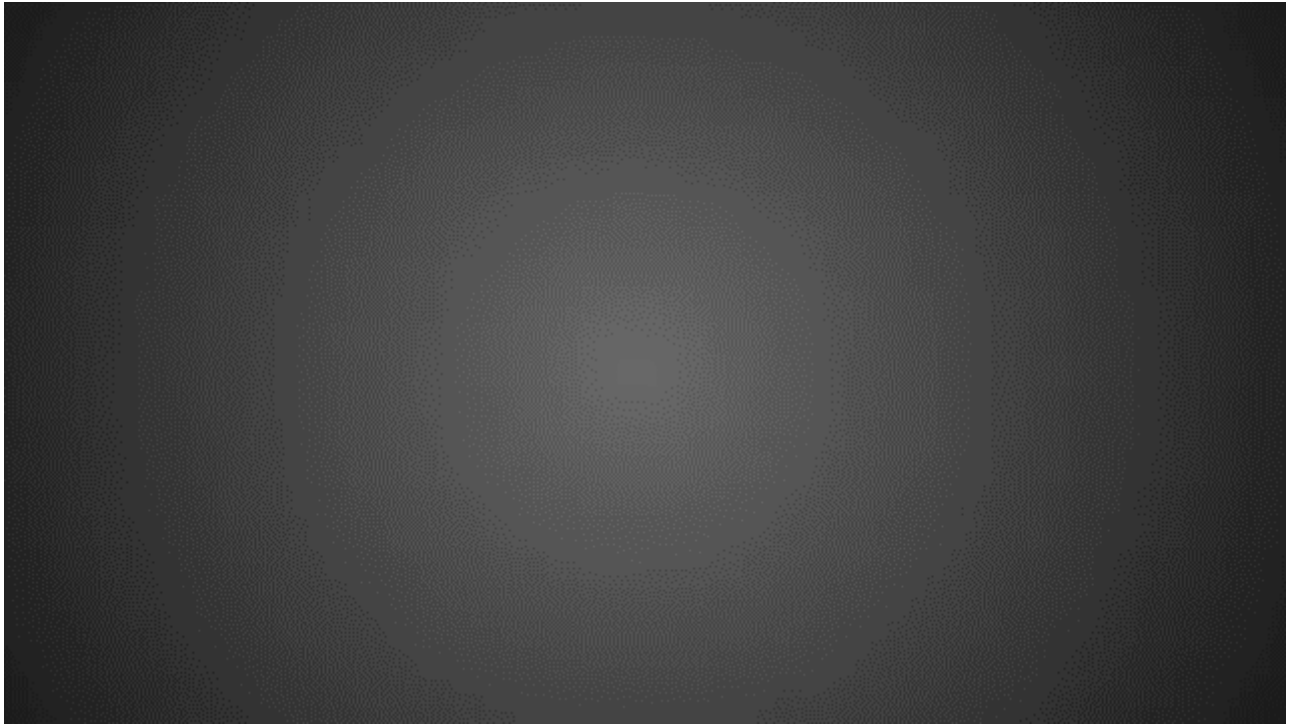
- New website to support with downloadable resources



**[CASTING
THE
FUTURE]**



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Just a start

Small steps.....

See www.thewfo.com/ and newsletters for more updates



Longer term

Filling in gaps by enabling collaboration

Benchmarking and quality assurance

Setting standards

“There is a light at the end of the tunnel – and it’s the glow from a furnace”.



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Thank-you

