



**Materials  
Processing  
Institute**



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# Welcome and Introduction

Chris McDonald  
Chief Executive Officer

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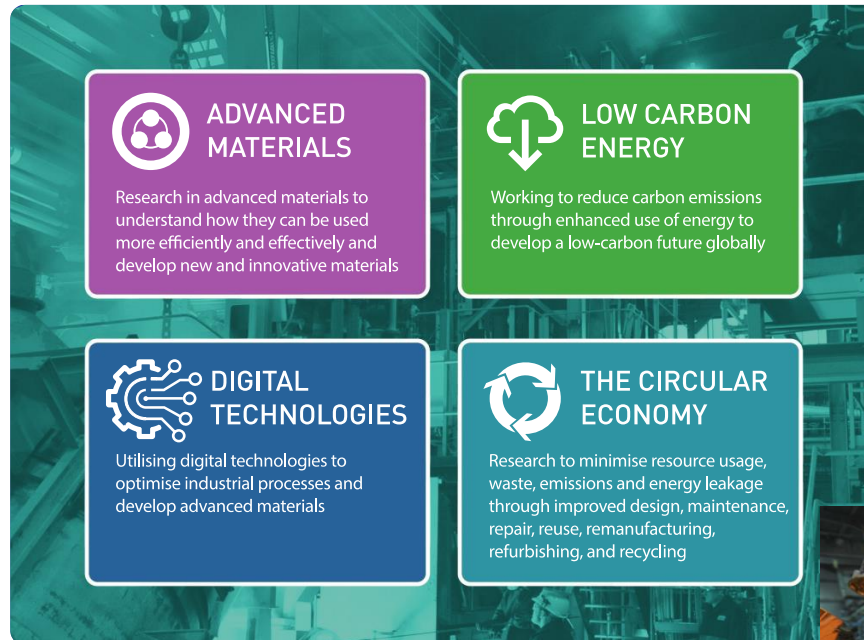
Excellence in Materials & Process Innovation

# Materials Processing Institute

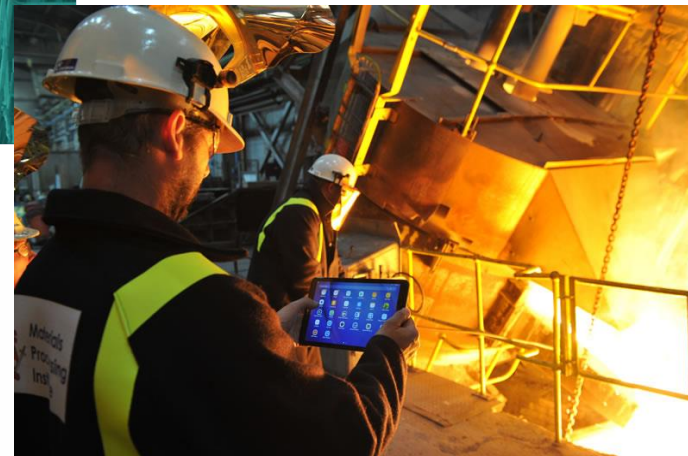




# Materials Processing Institute



- The Institute is independent and not-for-profit.
- Developing new technology, process improvements and steel grades.
- Working with the materials sector globally.
- 8:1 return on investment for research projects.



Some clients...

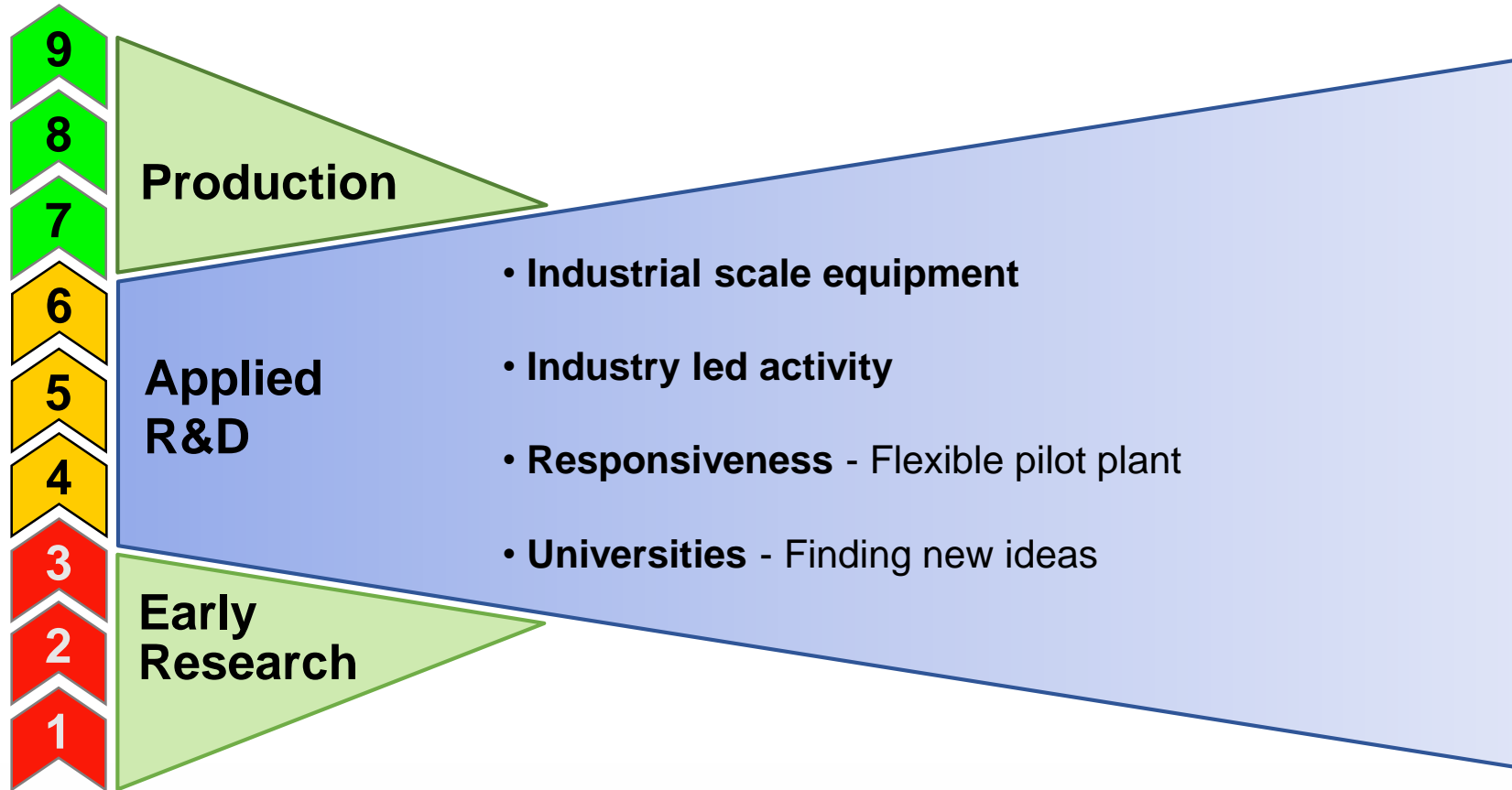


ThyssenKrupp



Plus: supply chain, minerals, equipment suppliers, ....

# Innovation Landscape



# Unique Capabilities





# Services

## 1. Research Services

- Research programmes
- Specialist testing, e.g. failure analysis

## 2. Consultancy

- Technical due diligence
- Capex due diligence
- M&A assessment: market or technology

## 3. Training

- Bespoke, specialist courses
- Standard Institute courses

## 4. Specialist Melting

## 5. Library & Information Services

- Patent, IP, literature searches
- Alerting bulletins

## Surface Cracking at the Rolling Mill

### THE PROJECT

Problems with surface cracking were found at a rolling mill when processing 305mm thick cast slab into 40mm thick plate. The Institute was requested to investigate to identify the cause of the problem.

On-site investigations quickly identified that the cracking was originating in the feedstock. Figure 1 shows an example of the cracks found in the cast slab.

Samples of slab were selected for investigation.

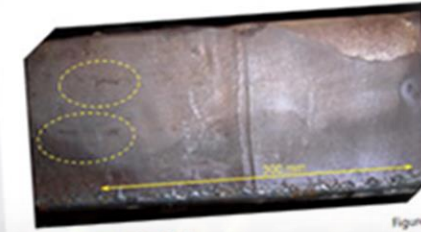


Figure 1

Surface cracking found on feedstock slab





# Networks

## Universities

- Chair of metals processing at Leicester
- CDTs: Oxford, Sheffield, Durham (data science)
- Collaborations: Warwick, Swansea, Birmingham
- PhD symposium – prestigious annual event

## Funding Bodies

- Regional – TVCA, ERDF
- National – BEIS, InnovateUK, EPSRC

## International

- MetNet, WorldSteel, EUROFER, ERFCS, ESTEP

## Industry

- CBI innovation Cttee
- FSB innovation lead
- UK Steel
- UK Metals Council

<https://www.mpiuk.com/membership.htm>



# Materials Processing Institute



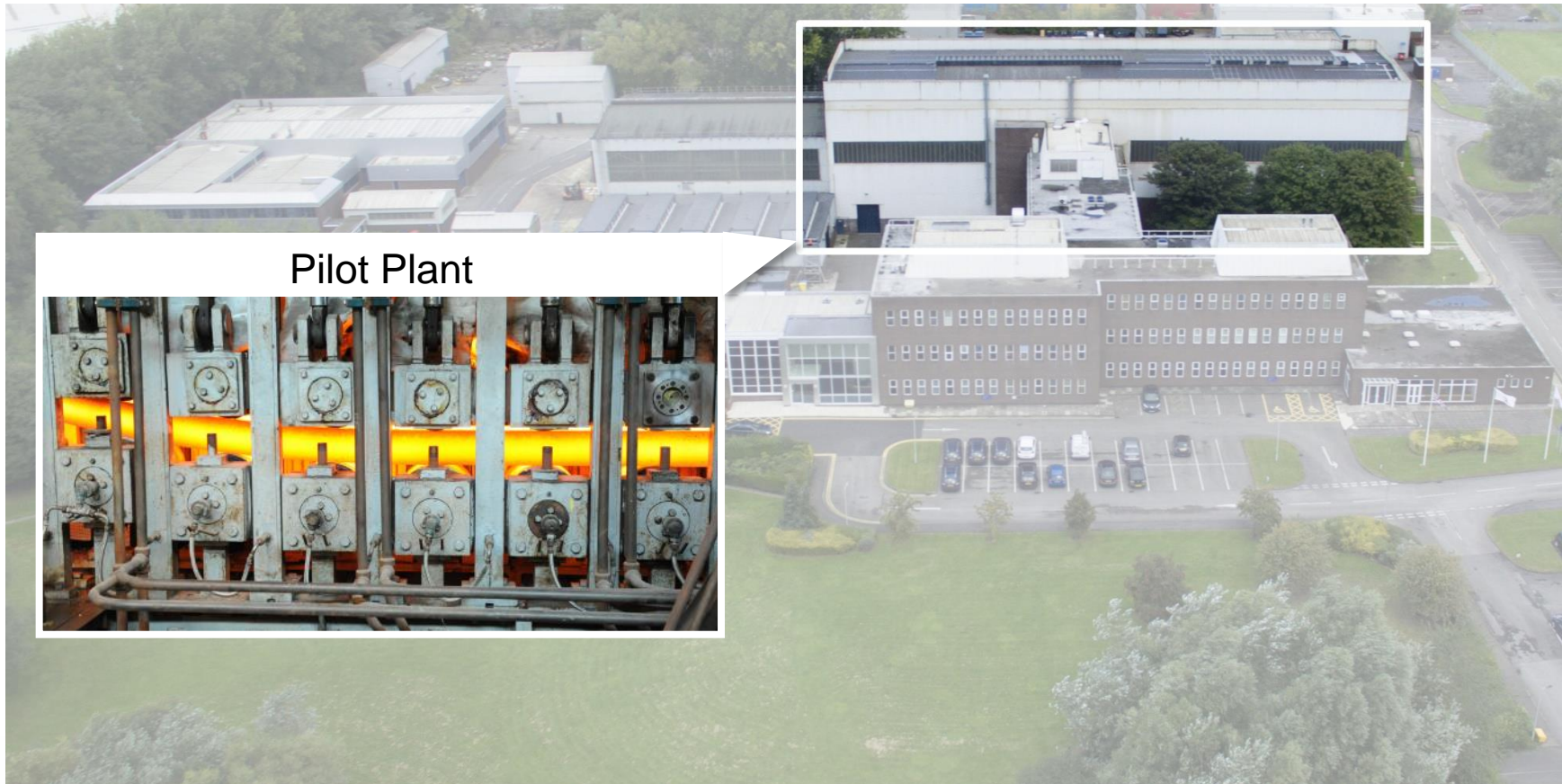
Laboratories

# Laboratories



- Petrography and coke analysis
- Ferrous materials/ agglomeration
- Refractories: hot and cold testing
- Thermodynamics: empirical
- Fluid dynamics: physical modelling
- Simulation: CFD, FEM, DEM, numerical, thermodynamics
- High Temperature: slags and powders
- Metallography: SEM, SEM-Tensile, optical, macro
- Instrumentation: design and prototype

# Materials Processing Institute





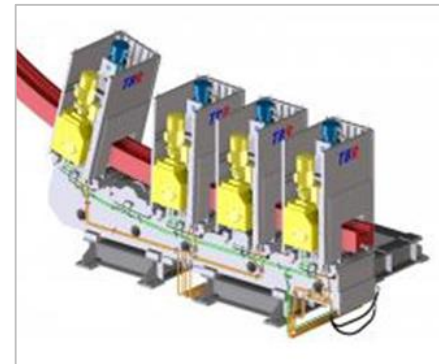
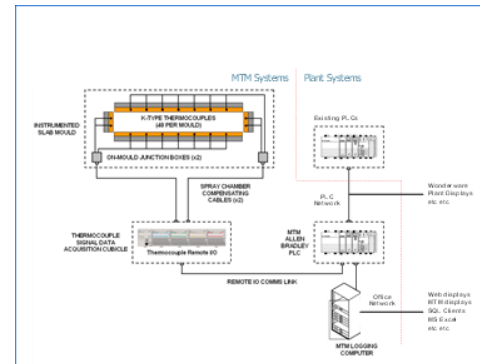
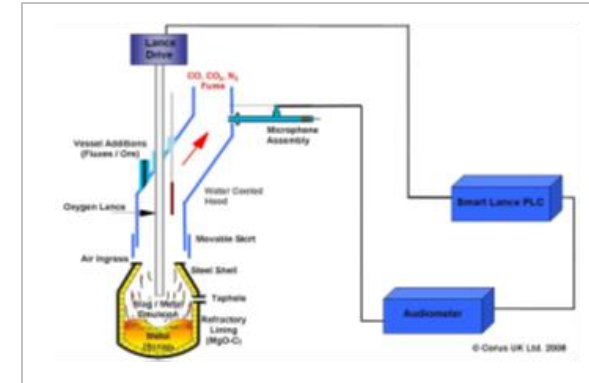
# Pilot Plant – Main Facilities



- 7T AC Electric Arc Furnace
- Combined vacuum degassing and ladle furnace
- Continuous casting
  - Billets and mini-slab
  - Up to 20m cast length
  - Suitable as direct mill feed
- Ingot casting: slab, 5T and 5.9T square
- 100kg Vacuum Induction Melting
- Up to 250kg air induction melting
- 750kg moveable wall coke oven

# Technology Development

75 year track record in turning new ideas into production scale technology suited to industry's needs, using the expertise of the Institute's process engineers and scientists to drive technology from TRL 3 (ex-university or similar) to 7 (successful demonstration in operations) and beyond.



# Summary of Capability

- Expertise, capabilities and assets to enable clients to:
  - Explore and develop new materials and processes, and improve existing ones
  - Improve process reliability
  - Realise lasting improvements in energy and raw materials efficiency
  - Enable reduction or reuse of waste
  - Reduce the environmental impact of processes
- Technical and engineering capability backed up with large scale pilot and demonstration facilities, where concepts are developed and proved.
- Supported by engineering, process simulation, modelling and laboratory services.



# Materials Processing Institute



# Thank You

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