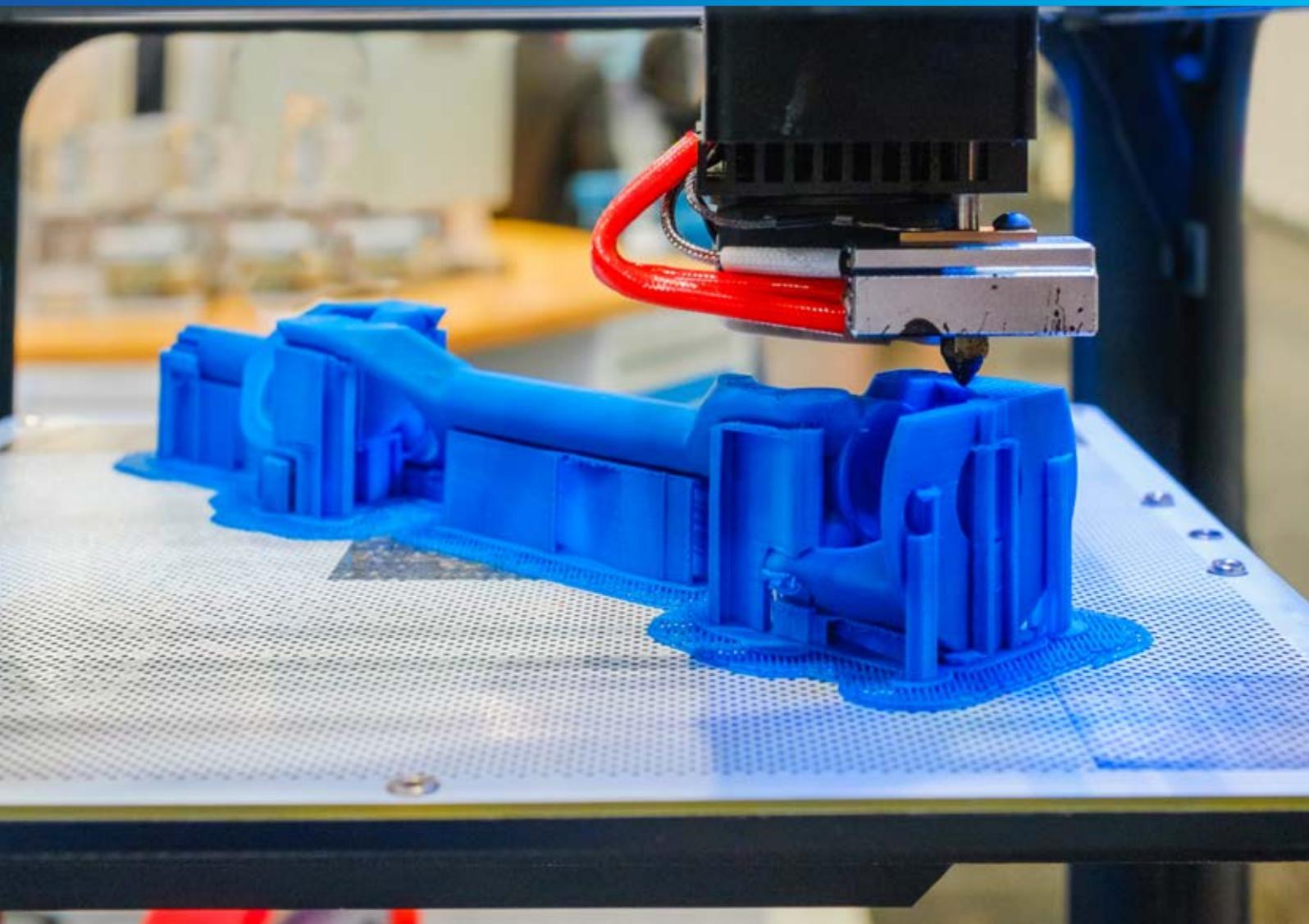




## Casualty Risk Trends Machinery & Technology

The manufacturing industry finds itself in a period of substantial change, brought about by new technologies and new adaptations of existing technologies. The industrial internet of things, lithium-ion batteries, 3D printing and 5G networks combine to present manufacturers with both tremendous opportunities and risks not considered before.



1

## Industry 4.0/Industrial Internet of Things (IIoT)

What is considered to be the fourth industrial revolution allows appliances and machines to be increasingly integrated and connected to other devices using sensors, actuators and wireless controls. This interconnectivity allows remote guidance and control of machines and appliances, allowing earlier detection of deviations or unsafe conditions.

There is, however, also a risk that consequences remain unnoticed for a longer period of time and that decisions taken autonomously by such cyber physical systems are inadequate. The information abundance and transparency comes at a higher risk for malicious interference and misuse of data privacy.



2

## Lithium-ion batteries

Extending applications of lithium-ion batteries to industrial and consumer products has become a notable trend. But under certain use conditions or manufacturing defects these batteries can fail and lead to overheating, fire or explosion. The drive for portability, durability and higher performance to create a unique user experience has become standard practice in the ever-intense product development cycle. These desirable product features are also driving the development of lithium-ion batteries to become lighter, smaller and store more energy, with longer lifecycles. Although product safety is considered from the beginning of the design phase, it is not highly prioritised in all companies. This attitude creates a dilemma between "higher energy density" and "better safety design", especially when the theoretical electrochemistry performance is gradually pushed to the edge.



3

## 3D printing

While additive manufacturing of three-dimensional parts using a computer-controlled printer is no longer considered innovative, it appears that the application spectrum is changing. Currently, 3D printing is utilised primarily for generating prototypes or single items. Steps towards wider application in commercial-scale production areas are accelerating. The acceleration comes both from the development of better performing metal printers and from the new polymer printer materials (polymer boost). These improvements are sustained by the entry of a number of chemical companies into the 3D printing space and by using new printing technologies as alternatives to traditional injection-moulding processes.



4

## EMF & the new mobile phone technology 5G

Exposure to electromagnetic fields (EMF) derived from electric/electronic products is generally increasing due to the adoption of novel technologies such as wearable devices. Negative health effects of EMF have remained a constant topic of debate: some scientists have recently proposed upgrading EMF health effects to the highest scale "carcinogenic to humans" according to the International Agency for Research on Cancer. These discussions have reached a new level of hype because of the introduction of 5G technology, the next-generation of mobile networks. 5G is intended to allow the Internet of Things to run and tie all internet-connected devices together. 5G networks can therefore be used as "highways" for new cyber attacks. 5G applications will require new spectrum bands in higher frequency ranges compared to the current 4G technology, allowing ultra-high rates of data transmission. Scientists are warning that before rolling out 5G, intensive research on human health effects should be completed because of some additional uncertainties related to the new 5G technology.



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## What can insureds do to minimise these risks?

## What is important to bear in mind when insuring these risks?

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### Industry 4.0/Industrial Internet of Things (IIoT)

- Equip connected machines with robust multi-layer cybersecurity.
- Identify potential vulnerabilities, threats and risks to software and data security as well as products and infrastructure by establishing a rigorous risk assessment approach.
- Proactively monitor and detect data breaches and threats.
- Prepare for outages of cyber-physical systems and mitigate such risks.
- Build awareness for cyber exposures as part of normal product liability.
- Address cyber-physical risks affecting data security and the integrity of connected machines with specific covers and not absorb them in conventional insurance products.
- Build expertise on data analytics and develop actuarial and modelling techniques to prepare for increasingly autonomous features and exposures from hyper-connectivity.

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### Lithium-ion batteries

- Comply with compulsory and voluntary standards associated with battery product safety (ie IEC, UL).
- Make sure that all possible usage scenarios are analysed and considered with an appropriate safety margin and fail-safe design.
- Acquire certification from professional third party(ies) for product safety.
- Implement and constantly improve quality management systems.
- Provide the client/consumer with a warning label.
- Understand the risk arising from lithium-ion batteries from both product liability and product recall perspectives.
- Be aware of the customer spectrum and possible shift of users.
- Closely monitor regulation changes and recall trends.
- Build basic battery knowledge for proper risk assessment such as chemistry, packaging, failure mode, design standards and quality control.
- Investigate the quality management procedure and identify possible "loop holes" in combination with historical defect incidents.

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### 3D printing

- Monitor and follow the development of the standards and regulations that are being created around additive manufacturing.
- Ensure workflow security since software plays a more and more important role in the additive manufacturing process. It is important for companies to safeguard intellectual property and data.
- Quality control: the rise of manufacturing applications, as opposed to prototyping ones, brings new challenges such as materials standardisation, better machine control and final product material testing, especially for industries with highly demanding quality requirements.
- Recall-preparedness: with increasing production numbers, companies need to prepare for product recalls with suitable corporate structures and procedures.
- Understand the insureds' position and responsibilities along the supply chain and apply the relevant underwriting and costing approach in terms of product liability and/or product recall.
- Closely monitor the development and changes in regulations.
- Build awareness of cyber exposures as part of normal product liability.
- Evaluate the combustible dust explosion hazard coming from certain metal 3D printing technologies such as selective laser melting due to the utilisation of finely divided metal powders in the process. At scale, this explosion hazard is potentially much higher than those presented by traditional manufacturing techniques.

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### EMF & the new mobile phone technology 5G

- Be proactive and try to minimise public radiation exposure.
  - Take into consideration the security challenges linked to the convergence of operational technology and information technology.
  - Closely monitor scientific research and public debate about the topic.
  - Address cyber risks affecting privacy and data security of connected machines.
  - Closely monitor the development and changes in regulation, eg setting new exposure limits.
  - Build awareness for potential new EMF exposures related to 5G for certain industries.
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