RISK MANAGEMENT
Flood proofing the future
Embedding a framework

LEGAL UPDATE
Sports pitches
Shift worker safety

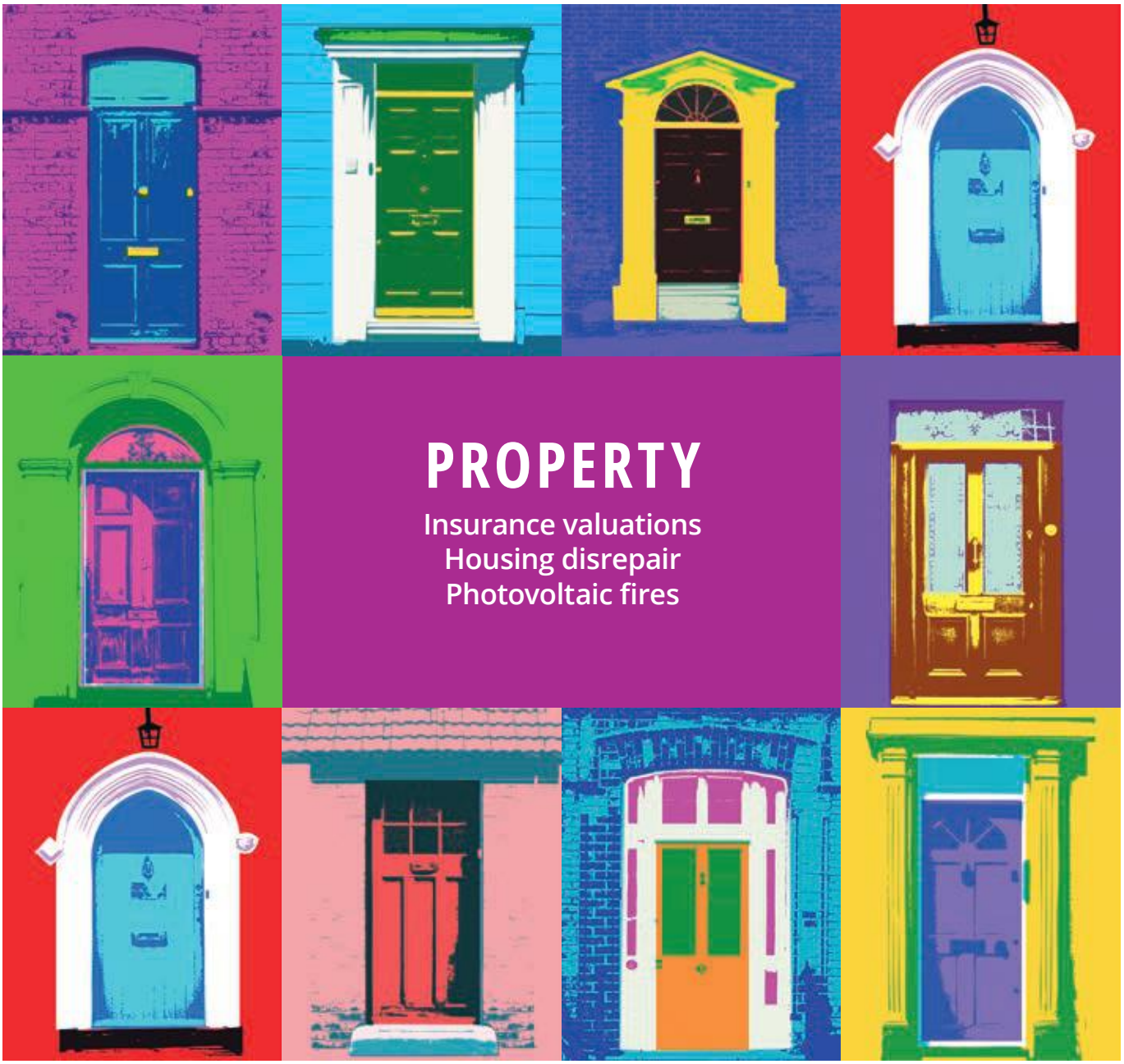
COVID-19
Organisational learning
Cyber crime

OPERATIONAL RISK
Compliant inspections
RIDDOR for care providers

stronger

THE ALARM JOURNAL

October 2020



PROPERTY

Insurance valuations
Housing disrepair
Photovoltaic fires

Between 10 April and 8 August 2020 there were 3,168 notifications (48 fatal and 3,120 non-fatal) to the HSE and councils by employers undertaking residential care activities.

While this HSE figure seems substantial, the HSE considers there to be under reporting. In the notes attached to the published figures of disease reports made by employers to the HSE to 11 July, the HSE states: '*RIDDOR* suffers from under-reporting. Not all employers report cases as required under the regulations. However, as there is no reliable estimate of the number of occupational COVID-19 cases, it is not possible to quantify the extent of under-reporting. However, in terms of reporting workplace non-fatal injuries, it is estimated that around half of *RIDDOR* reportable injuries to employees are reported to the enforcing authorities (for self-employed the proportion is substantially less). It is likely that disease reporting is lower.

This suggests that care providers may not be fully satisfying their reporting requirements under *RIDDOR* and more than half of COVID-19 related incidents may go unreported. ●

References
[1]hse.gov.uk/coronavirus/riddor/index.htm
[2]hse.gov.uk/coronavirus/riddor/riddor-reporting-further-guidance.htm
[3]hse.gov.uk/riddor/who-should-report.htm

Peter James (peter.james@blmlaw.com) is a Partner and leads the Safety, Health and Environment Team at BLM's London office. He represents organisations and individuals investigated by the police, HSE and Care Quality Commission, following accidents and deaths at care settings, and regularly represents care settings at inquests.

Edward Sainsbury (edward.sainsbury@blmlaw.com) is a Partner in the Disease Team at BLM and specialises in complex occupational disease claims, insurance disputes and health and safety matters.

Photovoltaic solar system FIRES

Photovoltaic fires are an emerging risk. Poor installation accounts for the majority of fires caused by solar energy systems.

AUTHOR: **Mark Cousins**,
Partner, Burgoynes, Melbourne.

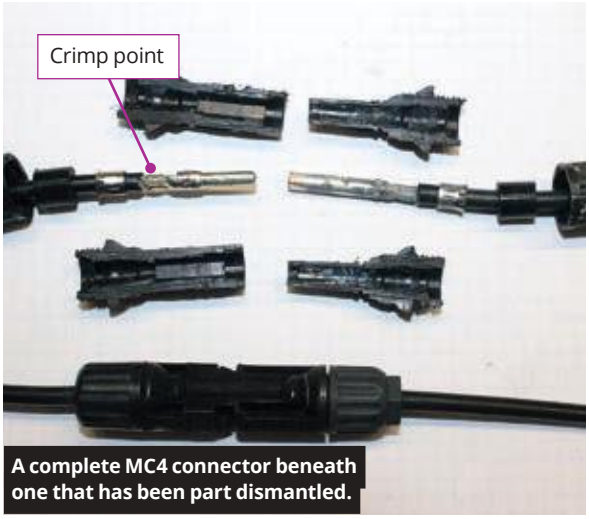
The drive for renewable energy and decarbonisation of heating systems has made photovoltaic (PV) solar systems more popular than ever. There are reported to be over 1 million systems installed in the UK and over 3.9% of the country's electricity needs during 2018 was generated by solar power[1].

With an increasing number of installations, reports of fires involving solar systems are becoming more frequent.

Burgoynes currently investigates ten to 15 cases in the UK a year that involve such systems. These cases include large-scale solar farms generating many mega-watts of electricity, medium-scale systems at industrial premises generating between ten to 500 kilowatts (kW), and small-scale systems at domestic premises (typically rated at around 4kW).

How PVs work

A solar system essentially comprises an array of PV panels that converts solar radiation (sunlight) into direct current (DC) electricity and an inverter that converts the DC electricity into alternating current (AC) electricity at the correct frequency.



A complete MC4 connector beneath one that has been part dismantled.

The AC output from the inverter is connected to the consumer unit or distribution panel, and the power from the system supplies the circuits connected to that consumer unit or distribution panel, providing power to the premises.

This arrangement means that any excess power generated by the system is fed directly into the electricity supply grid.

Cause of fires

Since 2010, Burgoynes have investigated around 120 fires where PV solar systems were initially reported to be involved. Of those fires, only 30 incidents were positively attributable to a defect on the solar system, although it was considered a possible cause of the fire in 20 further cases.

Of the 3,000 fires investigated by Burgoynes each year, only a small proportion appear to result from an incendive defect on a solar system.

Despite the inverters being the most complex part of any PV system, fewer than five per cent of the fires where sufficient evidence survived to identify the precise cause of fire were attributed to a defect at the inverter. By contrast, 75% of the fires were associated with poor installation, with defects at MC4 connectors and DC isolators being the most common cause of fire.

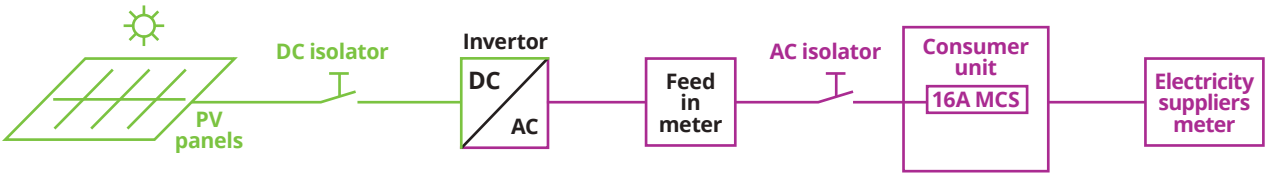
MC4 connectors have become the standard for jointing DC cables on solar systems. The connector pins are crimped onto the cable using a dedicated tool. A significant proportion of fires involved poor crimping practice when making those joints. This can lead to resistive heating faults at the joints and their subsequent development to catastrophic failure, which can occur several years after installation.

Fires at MC4 connectors have been also been found to be the result of resistive heating defects arising from corrosion due to water ingress into the connector.

DC isolators provide a means to isolate the array from the inverter and allow work to be undertaken safely on the system.

Resistive heating defects at either the terminations or the contacts represent the most common cause of fires at the isolators.

The arrangement of a typical domestic installation



Such faults can arise from the isolator being incorrectly rated, improperly wired, or the screw connection between the isolator and the cables being poorly formed at installation.

Having identified that poor installation accounts for the majority of fires caused by solar systems, installers of such a system should be suitably qualified and fully familiar with the specific installation requirements of such systems.

Having identified that poor installation accounts for the majority of fires caused by solar systems, installers should be suitably qualified and fully familiar with the specific installation requirements of such systems.

One method to ensure this, which was a specified condition if the system was to qualify for a feed-in-tariff and its recent successor a smart export guarantee tarrif[2], is to ensure the installer is MCS (Microgeneration Certification Scheme) registered. Such an installer should be adequately trained and ensure the installation fully complies with MCS guidelines. A reputable installer should also issue an MCS compliance certificate on completing the installation to confirm its compliance.

PVs and fire-fighting

While not directly related to the cause of such fires, we are aware that PV panels can sometimes hamper a fire-fighting operation. The issue is that panels generate power continuously in daylight hours. As the voltage present on DC cables is often around 600 Volts (V), but can be up to 1,000V, there can be a significant risk of electric shock to the emergency service personnel if the DC cables are damaged in the incident and they touch them.

Until recently, there has been no straightforward and practical way to quickly isolate the DC cables. However, one method to deal with this issue encountered recently by a Burgoynes investigator, was the use of a spray-on rubberised coating applied by fire-fighters, that blocked sunlight to the panels[3].

Takeaways:

- Although PV solar systems are becoming more common, available data indicates the number of fires caused by such systems remains relatively low.
- A review of investigations undertaken by Burgoynes indicates the majority of incendive failures in PV solar systems are attributable to poor installation.
- Installers of such systems should be adequately qualified and fully familiar with the installation requirements of such systems. Use an MCS registered installer who can provide an MCS compliance certificate on completion.

References

[1]Number of systems: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911925/Solar_photovoltaics_deployment_July_2020.xlsx and Percentage of power generated: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789371/ET_6.1.xls

[2]energysavingtrust.org.uk/renewable-energy/electricity/solar-panels/smart-export-guarantee-and-feed-tariffs

[3]pvstop.com.au/

Mark Cousins (mark.cousins@burgoynes.com) is a Partner at Burgoynes, Melbourne. Mark's career began with the Ministry of Defence (MoD) and joined Burgoynes' Cardiff office in 2002, becoming a Partner in 2014. Mark attained Certified Fire Investigator status with the International Association of Arson Investigators in 2018, and in 2019 opened Burgoynes' Melbourne office.

Founded in 1968, Burgoynes is an international partnership providing specialist forensic services to a wide range of clients, including loss adjusters, insurers, reinsurers, law firms and businesses. With more than 60 investigators, Burgoynes investigates around 3,000 incidents a year involving fire, explosions and other engineering failures. **burgoynes.com**