



HALLIWELL

**DR JAN GRAHAM BSc ACGI MSc DIC
PhD**

**DIRECTOR
LONDON, UK**

jan.graham@halliwellforensics.com
+44 (0)7798 721 630 | Mobile
+44 (0)20 3369 0469 | Office
halliwellglobal.com

SPECIALTIES

- Fire Investigation
- Mechanical Engineering
- Marine Engineering
- Structural/Cane Failure
- Fire Protection
- Explosion Investigation
- Materials Failure
- Personal Injury
- Renewable Energy
- Litigation Experience
- Escapes of Fluids
- Metallurgy
- Road Traffic Accident
- Power Generation

BIOGRAPHY

Jan completed a Bachelor's degree in Aeronautical Engineering at Imperial College in the course of his graduate apprenticeship with British Aerospace, and returned to obtain a Master's Degree in Composite Materials. Jan moved to the Mechanical Engineering Department of Imperial College as a Research Assistant and undertook research leading to his Doctorate in Mechanical Engineering and then took a position as a postdoctoral Research Associate.

Jan joined Geoffrey Hunt & Partners as an Associate in 1997, becoming a Partner in the firm in 1999 and then joined Halliwell Forensics in 2023. He specialises in branches of mechanical engineering including materials science and performance, design, structural analysis, mechanics and dynamics. Jan also undertakes personal injury investigations including safe systems of work, road traffic accident reconstructions, and fire investigations.

Jan has given evidence on numerous occasions in the Civil, Criminal and Coroners' Courts.

QUALIFICATIONS

BSc(Eng) ACGI, Honours Degree in Aeronautical Engineering, Imperial College, London - 1989

MSc DIC, Composite Materials, Imperial College, London - 1990

PhD, Mechanical Engineering (Strength of Materials), Imperial College, London – 1994

PROFESSIONAL EXPERIENCE

- Halliwell, Director
- Geoffrey Hunt & Partners LLP | Consulting Engineers & Scientists, Partner
- Geoffrey Hunt & Partners LLP | Consulting Engineers & Scientists, Associate
- Imperial College, Engineering Consultancy (Research Associate)
- British Aerospace plc, Graduate Apprenticeship

REPRESENTATIVE ASSIGNMENTS

Recent Engineering Investigations Undertaken

- Internal combustion engine failures including: a large number of diesel engine failures after remanufacture using a particular batch of cylinder heads; engine failure due to variability in manufacturing tolerance and assembly procedures; engine failure after faulty maintenance; engine failure due to operator misuse; failures of CHP plant incorporating gas-fuelled powerpacks;
- Failures of tower cranes and mobile cranes in the course of operation and erection/dismantling; failures of passenger lifts, and other lifting equipment including hydraulic jacks;
- Failures of signs/hoardings and staging owing to wind loads;
- Various aspects of train performance including derailments and failure of underbody equipment;
- Defects in water transport pipework and ancillary system design, installation or commissioning resulting in: flooding at major City Bank premises; flooding at a Local Authority sports centre;
- Flooding or failure of water supply at a number of other commercial and residential properties;
- Failures of containments resulting in breach and molten metal break-out including: molten iron break-out from a blast furnace ladle; molten zinc break-out from a hot-dip galvanizing tank;
- Explosions and defects in oil and gas fired space heaters;
- Pipework welding and jointing defects in sprinkler installations;
- Defective electroplating of consumer goods;
- Failure of electroless plating line;
- Failure of fire suppression systems, including failure of sprinkler heads, and failure of CO2 suppression systems to operate, and failure of CO2 suppression systems to control fires;
- Damage caused by fire and the effects of extinguishment water to tools, equipment and plant at commercial premises;
- Strategies for remedial action immediately after the fire and the effects of delay of remedial action;
- Analysis of failures in gas and fluid transport pipework and ancillary equipment and systems including: the effects of vibration; the effects of corrosion and other environmental conditions; inadequate pipework support leading to excessive mechanical loading; mechanical damage;
- Analysis of aspects of design of machine elements leading to loss of security of component fixation and subsequent failure of rotating equipment;
- Analysis of corrosion and stress corrosion failure mechanisms in heat and power generating plant including intercoolers and turbine blades;
- Failures of structural composite materials including: penetration of acid/chemical storage tanks and tank lining systems; environmental degradation of bulk storage silos; failure of lining systems of water supply installations; failures in bolted and welded structural steel frameworks and scaffolding structures, including analysis of weld failures;
- Investigations into the circumstances of incidents and personal injury cases on construction sites in both civil and criminal contexts involving: plant and equipment unsafe through design or poor maintenance; the provision of safe systems of work including the design and implementation of exclusion zones; temporary works including propping, shoring, cofferdams etc; slips, trips and falls;

- Road traffic accident investigations involving: loss of control of an articulated dump truck on a quarry; loss of control due to brake failure in commercial and heavy goods vehicles and trailers; loss of control of motorcycles under various conditions; pedestrian “step out” incidents; the consequences of excessive speed and restrictive sight lines.

Research in all aspects of Materials Characterization, Response, Analytical, Numerical Structural and Component Stress Analysis

As an RA, research in all aspects of materials characterisation and response and analytical and numerical structural and component stress analysis. Projects included:

- Mode and mechanism of failure determination, and the effect of installation parameters on these, of domestic water supply pipework systems (copper, ferrous and polymer systems);
- Inspection of failed composite glass fibre/recycled polyethylene timber-replacement pilings;
- Material property determination, structural and thermal analysis;
- Recommendations for changes to manufacturing processes;
- Mode and mechanism of failure determination of composite insulator links from overhead high tension lines
- Assessment of process parameters of an HDPE production plant to prevent catastrophic failure and explosion;
- Material property determination over a wide range of strain rates and temperatures for a number of aluminium alloys for the design of a stir friction welding process;
- Assessment of the resistance to rapid crack initiation and propagation of novel resin formulations for the manufacture of water- and gas-transmission pipelines;
- Redesign of component structure, material specification, bonding and heat treatment of spacecraft optical instrumentation packages;
- Destructive testing and inspection of various failed automotive components (camshafts, rockers, cylinder heads, bearings, suspension and braking system linkages) to assess the extent of wear and the suitability of material specification;
- Numerical structural analysis of high-pressure superheated steam pipework;
- Analytical structural and vibration mode and resonance analysis of aeroengine transport cradles, structural analysis of gantry and walkway installations for aeroengine test stands, structural analysis of various items of ground support equipment;
- Failures in marine engine camshafts, conrods and bearings;
- Failure of high-pressure chemical reactor plant in Brazil.

Aircraft Design and Manufacture: Aircraft Structural Design

Aircraft manufacturing processes: airframe structural design; component quality assurance and non-destructive testing; materials selection; evaluation and determination of fitness for purpose; aircraft stability assessment.

Consulting Forensic Engineer

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Specializing in all aspects of materials performance, including elastic failure, plastic failure, creep, fast fracture, brittle fracture, fatigue and environmental failure; destructive and non-destructive inspection of failed components; component and structural stress analysis and assessment; personal injury investigations; road traffic accident reconstructions; fire investigations.

RECENT SPEAKING ENGAGEMENTS

- Published research findings in Composites Science and Technology, The Journal of Materials Science and The Journal of Composite Materials.
- Presented papers at scientific conferences including the European Conference on Fracture and the International Conference on Composite Materials
- Experienced in the preparation of detailed illustrated reports for litigation on behalf of Insurers, Loss Adjusters and Solicitors and has experience of giving expert evidence in the Civil and Criminal Courts.