

Icon Skills at Risk Research

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Introduction

The preservation of cultural heritage in the UK depends heavily on highly specialised conservation skills. These skills are essential for maintaining historic objects, artworks, buildings and collections, ensuring their longevity for future generations. However, there is increasing concern within the sector that certain conservation skills are at risk of being lost due to limited training opportunities, reduced funding, and an ageing workforce.

This research is an initiative led by the Institute of Conservation (Icon) and supported by a grant from the Pilgrim Trust. The project seeks to identify these at-risk skills and develop strategies to sustain them through improved training, knowledge transfer.

The research assesses 22 areas of conservation, with the practical skills in each area defined with the support of steering committees comprising experts in the relevant field, including Icon Accredited Conservators and professionals with 10 or more years of experience.

Glossary

Conservation workforce are actors engaged with the range of interventive and preventive methods required to protect and preserve cultural property.

Knowledge is the understanding of material and theoretical knowledge required to apply a skill. This could include an understanding of material structure, principles and concepts of conservation, etc.

Skills are the practical and technical abilities used to care for, preserve, and repair cultural heritage objects, including manual techniques, material knowledge, and expertise developed through practice and training.

Skills at risk are conservation skills and knowledge that are vulnerable to being lost due to low numbers of practitioners, reduced frequency of practice, limited transmission, changing professional priorities, or declining opportunities for training and use. These include specialist technical or analytical skills where practitioner numbers are low and training routes are limited or disappearing, placing the associated knowledge, expertise, and technical capability at risk of long-term loss across the sector.

Skills demand are skills that employers, clients and commissioners require.

Skills shortages occur when there are insufficient appropriately skilled people available to carry out or sustain specific conservation practices and activities.

Skills gaps occur when members of the existing conservation workforce lack the knowledge or abilities needed to meet current professional, technical, or organisational requirements.

Technical skill is the practical abilities required to carry out specialised tasks effectively.

Areas assessed in the project

Archaeology

Waterlogged Organic Materials: conservation of waterlogged wood, waterlogged leather treatment, waterlogged textiles conservation, PEG impregnation and freeze-drying processes, wet storage management, desalination of organic materials, environmental monitoring and preventive care.

Maritime and Underwater Archaeological objects: conservation of shipwreck artefacts, marine concretion removal, desalination procedures, waterlogged composite artefacts, marine iron and copper-alloy treatment, salt contamination assessment, underwater excavation support, maritime collection management.

Burial environment archaeology: excavated burial artefact conservation, soil chemistry assessment, corrosion analysis, in-situ preservation strategies, recovery and lifting techniques, post-excavation stabilization, taphonomic awareness

Cremation assemblages: cremated bone identification and handling, stabilization of cremated remains, recovery of fragile cremation deposits, associated artefact conservation, packaging and storage of cremated material

Human remains conservation: ethical handling of human remains, skeletal stabilisation, fragile bone consolidation, creation of storage and packing solutions, conservation during excavation, legal and ethical compliance

Mechanical metal cleaning: air-abrasive cleaning, micro-drilling and precision cleaning, scalpel and hand-tool cleaning, pneumatic tool use, corrosion removal techniques, X-radiography-guided cleaning, surface preservation strategies

Book, paper, manuscripts and works of art on paper

Paper conservation: mechanical cleaning, washing and aqueous treatments, humidification and flattening, mending and tear repair, infilling and inlaying, leafcasting, consolidation, removal of previous repairs, mounting and housing

Book conservation: sewing and resewing, board and spine repair, endband repair, leather and parchment repair, page and leaf repair, rebacking, structural reconstruction, tooling and decoration techniques, conservation binding, rehousing.

Documents and manuscripts: mechanical cleaning, aqueous treatment and deacidification, flattening and structural repair, tear and split repair, treatment of inks and friable media, parchment treatment, seal and attachment conservation, conservation of maps and plans, archival records and manuscripts, mounting and protective enclosures.

Works of art on paper: surface cleaning, consolidation, structural repair, lining and support treatment, canvas repair, lining and support treatment, canvas repair, panel treatment, varnish treatment, filling and retouching, inpainting, mounting and framing, mixed-media treatment.

Ceramics and Glass

Cleaning: Dry and wet cleaning techniques, Removal or reduction of surface dirt, accretions, staining and inappropriate previous restoration, selection and testing of cleaning methods and materials

Consolidation: selection, testing and application of consolidants, consolidation of ceramic bodies, glazes, glass and associated decorative or surface materials

Structural repair: preparation and alignment of broken fragments, selection and testing of appropriate adhesives, controlled bonding and assembly of complex objects

Colour filling: matching of colour, opacity, texture and surface finish, application of colour fills in a distinguishable manner

Gap filling on high and low fired ceramics: preparation and application of fills compatible with porous and softer ceramic bodies, matching of texture, profile and surface characteristics

Gap filling on glass: selection and preparation of suitable fill materials for glass, management of optical, structural and aesthetic requirements (consideration of transparency, translucency, refractive qualities and visual integration), visual integration

Modelling, moulding and casting: hand modelling and reconstruction of missing elements, mould making from original material or surviving elements, selection and preparation of suitable moulding and casting materials, casting and finishing replacement or reconstruction of elements

Retouching: retouching of fills, repairs and areas of loss, colour matching and adjustment of hue, saturation, opacity and surface finish, brush application and other controlled application methods, minimal airbrushing

Gilding: preparation of surfaces prior to gilding, selection and application of appropriate gold and related materials, matching of original appearance

Display, handling and mounting: design and preparation of appropriate mounts, creation of supports and hanging systems

Mirrors: glass repair, mirror backing and reflective layer conservation, loss compensation and gap filling, colour filling and retouching, frame and structural element conservation, mounting, handling and installation

Complex mixed-media objects: treatment approaches to conflicting materials, application of integrated treatment strategies, treatment of objects combining ceramics and/or glass with metals, wood, textiles, plastics or other materials

Chandeliers and complex glass structures: Cleaning of glass chandeliers, treatment of complex multi-component glass objects, structural repair and assembly, working with metal frameworks, working with electrical components and suspension systems, safe installation

Archaeological glass: treatment of highly degraded or unstable archaeological glass, treatment of glass corrosion, crizzling, delamination and surface instability, cleaning of archaeological glass, consolidation of archaeological glass, creation of storage and display solutions

Collections care and preventive conservation

Environmental management: environmental monitoring and control (temperature, relative humidity, etc), light monitoring and management, pollution monitoring and mitigation, vibration monitoring and management, data analysis and interpretation.

Integrated pest management: pest monitoring and identification, prevention and treatment strategies, quarantine procedures, housekeeping and inspection programmes.

Risk management: collection risk assessment, mitigation strategies, collection vulnerability and condition audits, surveying collections, data analysis

Emergency preparedness and response: disaster planning, emergency response, salvage and recovery of collections, disaster response training

Exhibitions and projects: preventive conservation for exhibitions, display planning, loan requirements, mount making, display case design, display case testing, object installation

Sustainability: carrying out sustainable preventive conservation practices, balancing environmental targets with collection preservation, energy management

Decorative surfaces (Built heritage):

Surface cleaning and paint layer conservation: dry surface cleaning, controlled aqueous cleaning, solvent-based cleaning, removal of surface dirt and deposits, reduction of staining and discolouration, removal or reduction of inappropriate coatings, cleaning painted and decorated surfaces without damaging original material, cleaning textured, uneven and fragile surfaces, testing and evaluating cleaning methods, localised and selective cleaning, treatment of smoke and soot deposits, treatment of biological growth, consolidation of flaking and lifting paint, consolidation of powdering and friable paint, securing detached paint layers, reattachment of detached paint, retouching and visual integration of losses, inpainting and compensation of losses.

Plaster, render and substrate conservation: consolidation of friable plaster, reattachment of detached plaster, grouting and filling voids behind detached areas, stabilisation of cracks and structural fractures, repair of plaster and render losses, filling and levelling losses, matching historic plaster composition and texture, preparation and application of compatible repair mortars, repair of decorative plasterwork, stabilisation of moulded and ornamental plaster, treatment of interfaces between different substrates and materials

Conservation of decorative architectural surfaces: conservation of murals and large-scale wall paintings, conservation of painted architectural schemes, conservation of decorative plasterwork, conservation of ornamental and moulded surfaces, conservation of gilded surfaces, conservation of stencilled decoration, conservation of marbling and faux finishes, conservation of grained and painted finishes, conservation of sgraffito, conservation of inscriptions and lettering, conservation of historic wallpapers and wall coverings, treatment of decorative surfaces integrated with architectural features, stabilisation and repair of three-dimensional decorative elements, colour matching and preparation of conservation retouching materials

Structural, environmental and moisture-related conservation: treatment of salt-related deterioration, crack and movement monitoring, environmental monitoring, assessment of water ingress

Preventive conservation, maintenance and in situ care: environmental monitoring, light management, dust and surface deposition management, monitoring biological growth and pest activity, preventing mechanical damage, protecting surfaces during building maintenance, protective coverings and temporary protection, developing preventive conservation strategies for historic interiors, monitoring treated surfaces following environmental or building changes

Emergency response and salvage: emergency stabilisation of detached, cracked, flaking or damaged wall paintings, securing unstable paint, plaster and decorative elements, temporary consolidation of vulnerable surfaces, emergency protection of wall paintings and decorative surfaces, temporary coverings and protective measures, emergency response to water ingress and flooding, emergency drying and stabilisation, emergency condition assessment and damage mapping, salvage and recovery of detached paint, plaster and decorative fragments, sorting and identification of detached fragments, temporary storage and protection of recovered fragments, emergency removal of vulnerable decorative elements, temporary structural stabilisation, recovery and reconstruction following catastrophic damage

Film and photographic materials

Identification of processes: identifying photographic processes, identifying film types and formats, identifying photographic supports and image layers, identifying historic and specialist photographic processes, identifying composite photographic objects

Knowledge of material degradation: recognising deterioration in photographic materials, recognising deterioration specific to film, identifying chemical and physical degradation, recognising image-layer and emulsion deterioration, identifying mould, silver mirroring, vinegar syndrome and other forms of degradation, assessing the condition and stability of photographic and film materials

Preservation of photography and films: surface cleaning of photographs, negatives and film, stabilising damaged photographic materials, repairing tears, breaks and losses, repairing film perforations and splices, consolidating fragile emulsions and image layers, flattening and stabilising photographic prints, emergency treatment of photographs and film, preparing materials for digitisation or duplication

Mounting and storage: mounting and remounting photographic prints, repairing and constructing photographic mounts, making archival enclosures for photographs and negatives, making protective housings for film, preparing appropriate storage supports, housing fragile, oversized or unusual photographic materials, mounting and storing photographic albums and composite objects

Furniture

Furniture conservation and structural repair: repair of damaged or weakened wood and components, consolidation of damaged or weakened wood and components, conservation of complex or specialist historic furniture, conservation of complex construction and structural problems, conserving furniture incorporating materials such as metal, glass, leather, textiles, ivory or plastics

Furniture making and construction: making furniture, using traditional jointing techniques, repair and replacement of structural components, practical workshop skills, repairing carved elements, recreating missing decorative components, carving replacement components

Finishing and surface treatment: cleaning historic furniture surfaces, conserving original finishes, repairing damaged finishes, retouching and reintegration of surface finishes

Decorative and surface elements: repairing and securing loose or lifting veneers, veneer patching and replacement, repairing marquetry and inlay, reattaching detached elements, repair of decorative elements, integration of repairs with existing surface, conserving gilded surfaces

Industrial heritage

Transport Heritage: conservation of horse drawn carriages and carts; conservation of locomotives/engines; conservation of diesel engines, gas engines, other oil engines; conservation of electric trains; conservation of railway rolling stock, carriages and wagons; conservation of mobile steam engines: traction engines, steam cars, steam lorries, portable engines, etc.; conservation of motor vehicles: cars, buses, trams, lorries, motorcycles with petrol, diesel or electric engines; conservation of military vehicles: tanks, static and mobile guns; conservation of bicycles; conservation of aircraft.

Maritime and Waterway Heritage: conservation of marine steam engines, boilers and auxiliaries; conservation of ships and boats; conservation of steel and wood ship's rigging; conservation of shipwrighting; conservation of canal and dock equipment: gates, dry dock equipment, pumps, cranes, water hydraulics.

Industrial Machinery and Engineering Systems: conservation of mining machinery; conservation of mining and quarrying machinery; conservation of agricultural machinery: tractors, implements; conservation of milling machinery (millwrighting); conservation of wind and water mills; conservation of textile machinery: looms, spinning testing equipment, wool, cotton, flax, line shafting and drives (millwrighting); conservation of lighthouse optics and machinery.

Traditional Craft Skills and Material Treatments: conservation of leatherwork, saddlery, smith's bellows etc.; conservation of ornamental ironwork: bandstands, fountains, gazebos, railings, etc. and the treatment of such iron; conservation of blacksmithing (not fabrication), forging and repousse work; conservation of bronze statuary and monuments treatment and repair.

Water and Public Infrastructure: conservation of fountains and water treatment.

Horology and small mechanical objects

Disassembly, assembly and mechanical understanding: safe and systematic disassembly of clocks, watches and small mechanical objects; documentation of component position, sequence and relationships before and during disassembly; reassembly of mechanisms following treatment

Cleaning: cleaning of clock and watch mechanisms and associated components; mechanical, chemical and other appropriate cleaning methods; cleaning of cases, dials, hands, movement components and associated materials; removal or reduction of corrosion, dirt, degraded lubricants and inappropriate previous repair materials; recognition and preservation of historically significant surface finishes, wear and evidence of manufacture or use.

Clock and watch mechanism conservation: treatment of wear, corrosion, distortion and mechanical damage; stabilisation and repair of movement components; conservation of gears, pinions, escapements, springs, balances, pendulums and other mechanical components; cleaning, lubrication and adjustment; testing of mechanical function following treatment

Making replacement parts for historic mechanisms: design and production of replacement parts; hand-making of small mechanical components; replication of historic forms, dimensions and functional characteristics

Small-component machining and fabrication: use of hand tools for the production and repair of small components; turning, drilling, filing, cutting and shaping; basic and advanced machining of small-scale mechanical parts; fabrication of components using historically appropriate techniques; use of precision measuring tools

Jewels and bearings: jewel making and replacement; preparation and fitting of replacement jewels; watch jewel setting; correction of damage or wear to jewel settings

Watch case making and repair: watch case making and repair; treatment of structural damage; repair and replacement of case components; conservation of hinges, catches, bezels and associated fittings

Clock case making and repair: clock case making and repair, structural repair and stabilisation, conservation and replacement of damaged components

Dial conservation and restoration: conservation of painted, engraved, printed and enamelled dials; stabilisation and repair of damaged surfaces; cleaning and treatment of historic finishes; dial reconstruction or restoration; preservation of inscriptions, maker's marks and evidence of use.

Hands and small components: conservation, repair and fabrication of clock and watch hands; treatment of decorative and functional components; hands and small components replacement or reconstruction.

Enamel work: conservation of enamelled dials and cases; repair and stabilisation of damaged enamel; enamel work for the reconstruction or restoration of missing areas.

Watch glass: replacement of watch glasses; watch glass making and fitting; selection of historically and materially appropriate replacement materials.

Clock glass: replacement of clock glass; clock glass making and fitting; repair and replacement of shaped and decorative glass elements; selection of historically and materially appropriate replacement materials.

Glass cutting and shaping: cutting, shaping and finishing glass for horological objects; preparation of replacement glass to appropriate dimensions and profiles; understanding of historic glass forms and manufacturing techniques.

Fine metalworking and decorative metalwork: fine metalworking for clocks, watches and other small mechanical objects, cutting, filing, shaping and forming small metal components; repair and reconstruction of decorative metalwork, conservation of brass, steel, silver, gold and other metals used in horological objects; soldering, riveting, mechanical joining and other historic assembly techniques; preservation of decorative and functional surface finishes.

Engraving: conservation of engraved surfaces; clock engraving; engraving of metal horological components and cases; reconstruction or replication of engraved decoration; preservation of maker's marks, inscriptions and other significant markings.

Gilding and surface finishes: conservation of gilded horological objects; surface preparation for gilding; application and repair of decorative gilding; conservation of mercury fire gilding; conservation of other decorative finishes, including lacquers, plating and patination.

Historic manufacturing techniques: traditional clockmaking techniques; traditional watchmaking techniques; maintenance of traditional horological tools; application of historically informed techniques in repair and reconstruction.

Functional testing and adjustment: testing the operation of clocks, watches and other mechanical objects following treatment; adjustment of mechanical components; identification of faults affecting operation.

Leather

Cleaning and surface treatment: cleaning and surface treatment of leather; consolidation of friable or powdering surfaces; treatment of painted, dyed, embossed, tooled and finished surfaces

Repair and structural conservation: repairing tears, splits, cuts and losses; supporting weakened leather; repairing seams, stitching, straps and joins; making and applying repairs, inserts and fills

Reshaping and treatment of distortion: flattening and reshaping leather; treating shrinkage, deformation and dimensional change; working with rigid, moulded and cuir bouilli leather

Gilt, decorated and finished leather: conservation of gilt leather; conservation of painted, dyed and decorated leather; treatment of modern leather with polymer and other surface finishes

Leather upholstery, furniture and interiors: conservation and repair of leather upholstery; treatment of leather-covered furniture, desks, chests, cupboards and wall coverings; conservation of leather screens and large-scale interior objects

Specialist leather objects: conservation of clothing, footwear, luggage, bags and accessories; conservation of saddlery and harness; conservation of arms, armour and military objects; conservation of leather components of cars, carriages and other transport objects

Leather and skin materials: conservation of tawed, oil/fat-processed and smoke-processed skins; conservation of fish and reptile skins; conservation of gut and membrane materials; conservation of objects made using indigenous or traditional processing methods

Mounting, support and storage of leather: making supports and mounts; mounting flexible, rigid and large-scale leather; packing and storage of leather objects

Metals

Cleaning and corrosion removal: dry, mechanical and chemical cleaning methods appropriate to different metals and surface conditions; controlled removal or reduction of corrosion products, accretions, dirt and inappropriate previous restoration; cleaning of ferrous and non-ferrous metals; cleaning of precious metals and plated surfaces; selection and testing of appropriate cleaning methods and materials

Corrosion stabilisation and consolidation: stabilisation of fragile, corroded or structurally weakened metal; application of corrosion inhibitors and protective treatments; consolidation of composite or mineralised archaeological material where metal survives in a fragile condition

Mechanical working and metal fabrication: cutting, filing, shaping and forming metal; forging and working of ferrous metals; sheet-metal working and forming; casting processes and basic casting repair; replication or reconstruction of missing components

Surface treatments and finishes: preservation of original surface finishes; application and removal of protective coatings; polishing and controlled surface finishing; patination and matching of surface appearance; retouching and visual integration of repairs

Gap filling and reconstruction: preparation and application of suitable fill materials for losses; reconstruction of missing elements using compatible materials and techniques; modelling, moulding and casting of replacement components; mechanical and visual integration of reconstructed elements

Precious metals, silver and jewellery: treatment of silver, gold and other precious metals; cleaning and corrosion management appropriate to delicate or highly finished surfaces; repair of small and complex components; repair and stabilisation of chains, fittings, settings and decorative components; working with associated materials such as gemstones, enamel, textiles and organic materials; preservation of maker's marks, inscriptions and other significant surface evidence.

Coatings, gilding and decorative surfaces: conservation of painted, lacquered, plated and gilded metal surfaces; surface preparation and application of appropriate protective or decorative coatings; conservation of gold leaf, fire gilding and other gilded surfaces; treatment of decorative finishes without compromising evidence of manufacture, use or ageing

Display and mounting: design and preparation of mounts and supports; mounting and support of complex objects and multi-component structures

Modern and contemporary art

Mixed-media and complex objects: conservation of mixed-media artworks; conservation of paint applied to non-traditional supports (e.g. hessian, plastics, industrial materials); conservation of composite objects incorporating multiple materials; conservation of large-scale and complex installations; conservation of objects incorporating found, repurposed or manufactured materials; conservation of kinetic works; conservation of large scale sculptures; conservation of ephemeral work, replication of deteriorated works

Modern and unconventional materials: conservation of artworks containing food and organic materials, flowers and botanical materials, medical materials, blood and other biological materials; conservation of new resins and polymers used in modern artworks; conservation of 3D printings; conservation of weapons, blades, firearms; conservation of lights and bulbs; working with technology that is obsolete, conservation of works of art that contains soil and sand; conserving works of art that has unvarnished paint films and household paints rather than artist's paints

Contemporary conservation approaches: working with decision-making for artworks intended to change or deteriorate; conserving artistic intent alongside physical materials; documentation of artist intent and conservation rationale; working with stakeholders including living artists

Cultural knowledge and material traditions: working with cultural materials and artistic traditions; conservation of culturally specific materials and techniques; working within multidisciplinary teams; working with museums as custodians for works not owners

Musical instruments

Instrument maintenance and specialist repairs: historic keyboard tuning and maintenance; organ tuning and maintenance; guitar (or plucked string instrument) maintenance; restringing instruments (e.g. bowed string instrument setup); bow rehairing and maintenance; historic reed making; woodwind repair (wooden bores).

Conservation treatments and material interventions: techniques for cleaning and oiling brass and wind instruments; varnish and lacquer analysis and restoration; gilding beyond frames; making replica keys, rings and parts (casting, brazing, silversmithing, 3D printing).

Preventive conservation and collections care: pesticide and hazard identification and analysis for instrument collections; humidification techniques for different instruments; making anoxic enclosures and undertaking anoxia; environmental conditions for different instruments; handling, housing, transporting and mounting musical instruments

Conservation decision-making: instrument identification for the purposes of documentation and community consultation; understanding what constitutes original material for different instrument types (e.g. strings, cork placements, reeds, tenon stringing replaced during the instrument's working life); risk analysis for the use of different instrument types; understanding the risks associated with playing historical instruments and the risks associated with not playing historical instruments

Natural history

Taxidermy, skins, horn, feathers, fur and related dry zoological material: cleaning; care and stabilisation; repair; mounting, display and storage of taxidermy mounts; study skins and related animal-derived materials, excluding worked leather or processed organic textiles.

Osteology, antler, unworked ivory, eggs and similar zoological materials: cleaning; care and stabilisation; conservation of skeletal material, antler, unworked ivory, eggshells and related collections, excluding human remains and archaeological material; support, storage and mounting of skeletal material, antler, unworked ivory, eggshells and related collections, excluding human remains and archaeological material.

Entomology and other dry invertebrate collections: Conservation of pinned, mounted, boxed or stored insects and other dry invertebrates; pest management; labelling, rehousing and micro-scale work.

Fluid-preserved zoological and botanical specimens: conservation of wet collections; management of wet collections; emergency response; long-term storage of wet collections.

Botanical dry collections, including herbarium and ancillary collections: conservation of herbarium sheets, pressed plants, seeds, fruits, fungi, lichens, wood and related botanical material; freezing/pest treatment of herbarium sheets, pressed plants, seeds, fruits, fungi, lichens, wood and related botanical material; mounting, rehousing, and storage of herbarium sheets, pressed plants, seeds, fruits, fungi, lichens, wood and related botanical material.

Earth sciences collections: preparation and conservation of geological and palaeontological material, including rocks, minerals, gemstones, meteorites, fossils, subfossils and amber; mount-making and storage of earth sciences collections.

Microscope slides and other specialist preparations: conservation of microscope slides, prepared samples, thin sections, teaching preparations, DNA/tissue collections and other specialist scientific preparations; storage of microscope slides, prepared samples, thin sections, teaching preparations, DNA/tissue collections and other specialist scientific preparations.

Specimen preparation and preparation related conservation skills: preparation and stabilisation of zoological, botanical and geological specimens; making specimens usable for research, teaching or display, including preparation of zoological, botanical and geological specimens; replication of zoological, botanical and geological

specimens; reconstruction, mounting and support making for zoological, botanical and geological specimens

Paintings

Aesthetic treatments: removal of surface dirt; removal of varnish layers and other applied coatings; safe removal of old retouching and overpaint; retouching and colour matching across a variety of paint surfaces; filling of painting layers including producing textured surfaces; treatment of bloom, blanching, crusts and hazing; varnishing using a variety of methods and materials

Minor treatments on panel supports: minor isolated split repair; timber consolidation; paint consolidation on solid surface; minor inserts of lost edges/corners etc.; adjustment/loosening of cradle

Complex treatments on panel supports: complex compound split repair; auxiliary support removal; dis-joining and re-joining of panels; building up support to replace lost material; building up support to rectify loss of image along joins; new auxiliary support (appropriate choices and fabrication)

Linings and rigid supports of canvas: lining pre-treatments (consolidation from front and reverse, impregnation, moisture treatment, pre-stretching, facing); lining reversal (remove glue paste, Beva adhesives, others); filling and patching; interleaves; aqueous/synthetic/combo lining (glue-paste, Beva, mist or cold, wax); method and heat source lining (hand lining, vacuum envelope, low-pressure table and vacuum hot table); lining in combination of techniques; no heat employed lining (solvent activation); no pressure lining (contact lining); looming (during lining, double looming); treatments of lined paintings when they don't require re-lining and marouflage (onto honeycomb board, other rigid supports; with what adhesives)

Minor treatments and preventive conservation of canvas: tear mending and patching; moisture treatments; re-stretching; strip-lining; stretcher-bar linings; loose linings; solid inserts, backboards and membranes

Metal supports: framing and backing; treatment of corrosion; treatment of flaking paint

Artists board, composite boards, cardboard or hardboard: consolidation of boards; repair of damaged areas; treatment of warped boards; framing and mounting boards

Stretchers: stretcher repair; replacements of stretchers; treatment of blind stretchers

Stained glass

Cleaning and surface treatment: dry surface cleaning; wet cleaning; cleaning of soiling, deposits and surface accretions; cleaning historic glass while preserving original surfaces; cleaning painted and decorated glass; treatment of corrosion products; protecting vulnerable or friable surfaces during treatment

Glass repair and stabilisation: stabilising cracked and broken glass; joining fractured glass; edge bonding and repair; supporting fragile or weakened glass; repairing fragmented panels; loss compensation; retouching and visual integration; removing or modifying inappropriate previous repairs; treating damaged or deteriorated protective coatings

Conservation of painted and decorated glass: consolidation of flaking or friable paint layers; stabilisation of deteriorating painted surfaces; treatment of stained, enamelled and painted glass; protecting vulnerable decoration during cleaning and handling; repairing and stabilising decorated glass fragments

Lead and glazing conservation: repairing and replacing deteriorated lead comes; leading and releading stained glass panels; cutting, shaping and assembling lead comes; soldering lead joints; cementing and weatherproofing panels; repairing broken solder joints; strengthening and stabilising weakened panels.

Panel dismantling and reassembly: safe removal of stained glass panels; templating and measuring up; recording panels before dismantling; dismantling panels where conservation treatment requires it; cleaning and conserving individual glass pieces; setting out panels; reassembling panels; releading panels; weatherproofing panels; reconstructing damaged glazing patterns

Structural support and installation: designing and installing support systems; repairing and installing saddle bars and other support bars; tying and securing stained glass panels; installing panels safely within architectural settings; removing and reinstalling panels for conservation treatment

Protective glazing and environmental management: monitoring moisture and condensation; assessing the impact of pollutants and airborne deposits; designing and installing protective glazing systems; monitoring deterioration following installation

In situ conservation: undertaking conservation treatments in situ; temporary protection of windows during treatment; emergency stabilisation of damaged glazing

Creating new glass infills/additions: colour selecting glass and paint; drawing out design; glass cutting; glass painting; firing glass in a kiln

Preventive conservation and maintenance: identification of early signs of deterioration; cleaning and maintaining stained glass in situ; assessing risks from water ingress and building defects; monitoring protective glazing systems; preventing physical damage during building works

Packing, transport and storage: designing bespoke supports for transport; packing and unpacking stained glass; preparing panels for storage; temporary storage of removed windows; preparing panels for loans, exhibitions or off-site treatment

Emergency response: emergency stabilisation of cracked or damaged panels; salvage and recovery of broken glass fragments; recording shattered or displaced glazing; temporary boarding and protection of damaged windows; fragment sorting and identification; emergency removal of vulnerable panels; recovery following storms, vandalism, fire or building damage; reconstruction and stabilisation following catastrophic damage

Stone

Cleaning: dry, wet and mechanical cleaning; selection and testing of cleaning methods and materials; removal or reduction of surface soiling, accretions and inappropriate previous repair material; removal and management of biological growth; cleaning of carved, decorated and fragile stone surfaces; use of poultices and other specialist cleaning methods.

Salt and moisture management: use of desalination and poulticing techniques; assessment of moisture movement within stone and masonry; development of appropriate treatment and preventive strategies to reduce future deterioration.

Consolidation: selection, testing and application of appropriate consolidants; assessment of consolidant penetration, effectiveness and long-term behaviour; consolidation of carved, decorative and archaeological stone; monitoring and evaluation of treatment outcomes.

Crack repair and structural stabilisation: stabilisation and repair of fractured stone; bonding and joining of broken fragments; use of pins, dowels, armatures and other support systems; selection and testing of compatible repair materials.

Gap filling and plastic repair: application of suitable fill and repair materials; matching of colour, texture, porosity and surface characteristics; plastic repair of damaged or eroded areas; reprofiling of losses.

Carving, cutting and shaping: hand carving and shaping of stone; cutting and dressing replacement stone; reproduction of simple and complex forms; matching replacement material and carving techniques to the original.

Indents and replacement stone: selection of compatible replacement stone; cutting and fitting of indents; preparation and finishing of replacement elements; mechanical fixing and integration with the original stone.

Mortars, pointing and grouting: preparation and application of compatible repair mortars; lime mortar preparation and use; repointing and repair of masonry joints; injection grouting and void filling.

Surface finishes and decorative stone: conservation of carved, polished, painted or otherwise decorated stone surfaces; conservation of inscriptions, reliefs and decorative carving; polishing and finishing; treatment of painted, gilded or composite decorative surfaces in collaboration with relevant specialists.

Sculpture and three-dimensional objects: treatment of freestanding stone sculpture; stabilisation and repair of fragmented or structurally vulnerable objects; treatment of carved and highly detailed surfaces; design and use of appropriate supports, mounts and armatures; reconstruction of losses.

Archaeological stone: treatment of excavated and archaeological stone; cleaning and stabilisation of fragile material; management of salts and moisture-related deterioration; conservation of inscriptions; carved surfaces and archaeological evidence; development of appropriate storage and display conditions.

Monuments, memorials and funerary stone: treatment of gravestones, memorials and commemorative monuments; conservation of inscriptions and carved decoration; stabilisation of leaning, fractured or structurally unstable monuments; cleaning and biological growth management; repair and replacement of damaged elements; consideration of ethical, cultural and community values associated with funerary heritage.

Textiles

Costume conservation: surface cleaning; wet cleaning; solvent cleaning; stain treatment; humidification and reshaping; structural repairs; support and reinforcement; stitching and adhesive repairs; securing detached or fragile elements; treatment of complex garments; conservation mounting and display preparation

Shoes and dress accessories: surface cleaning; structural repair; stitching and adhesive repairs; support and reinforcement; treatment of composite accessories; stabilisation of fragile materials; conservation mounting and display

Tapestry conservation: surface cleaning; wet cleaning; structural stabilisation; stitching and support; lining and backing; edge and selvedge treatment; infilling; mounting and display

Carpets and rugs: surface cleaning; wet cleaning; stain treatment; structural repair; reweaving and infilling; securing weakened areas; edge and fringe treatment; lining and backing; mounting and display

Flat and painted textiles: surface cleaning; wet cleaning; consolidation of painted and applied elements; structural repair and support; stitching and adhesive treatments; treatment of hanging and suspension systems; mounting and display

Upholstery: surface cleaning; wet cleaning; structural stabilisation; stitching and repair; support and reinforcement; treatment of upholstery layers and fillings; conservation upholstery techniques; treatment of upholstery attached to furniture.

Furnishing textiles: surface cleaning; wet cleaning; stain treatment; structural repair; stitching and support; lining and backing; treatment of large and heavy textiles; treatment of curtains, pelmets and wall coverings; display of furnishing textiles

Modern and contemporary textiles: surface cleaning; treatment of synthetic and mixed fibres; treatment of unconventional and composite materials; stabilisation and structural repair; consolidation; adhesive treatments; treatment of plastics, foams and coatings; mounting and display.

Textiles in libraries and archives: surface cleaning; stabilisation and repair; stitching and support; treatment of textiles attached to books and bindings; treatment of embroidered books and book covers; treatment of textile sample books; mounting and housing.

Archaeological textiles: surface cleaning; stabilisation of fragile and degraded fibres; consolidation; support; lifting and handling of fragile fragments; humidification and reshaping; treatment of burial textiles; mounting and display

Ecclesiastical textiles: surface cleaning; wet cleaning; stain treatment; structural repair; stitching and support; treatment of embroidery and applied decoration; treatment of vestments; treatment of altar and furniture hangings; mounting and display

Timber work

Traditional timber working and carpentry: cleaving and riving; hewing; pit sawing and two-person sawing techniques; hand skills (hand-sawing, boring and drilling, chiselling and carving, shaping and fitting); tool maintenance.

Traditional timber jointing: joint design; understanding structural behaviour and specification; setting out techniques; mortise and tenon joints, lap joints, scarf joints, housing joints, notched joints, butt joints, passing joints; adapting and repairing historic joints.

Structural timber conservation and repair: repair specification and implementation; temporary stabilisation (scaffolding, propping, structural supports, etc); timber repairs (patch, scarf etc); Retention of historic material; reinforcement techniques; integration of metalwork; application of structural adhesive systems; retrofit and climate adaptation

Non-structural timber conservation: conservation of doors, windows, staircases, floorboards; conservation of panelling, built-in fittings, mouldings; decorative timber features (carvings etc); conservation of cladding, timber roofing components; decorative external timberwork (carvings etc).

Traditional timber finishes and surface protection: cleaning and surface preparation; historic paint systems, standard and decorative (graining, marbling etc); colour schemes; tar and pitch coatings; external limewash applications.

Time-based media

Electronic systems: construction, repair and modification; testing electronic circuits using diagnostic equipment; reading and interpreting electronic circuit diagrams; identifying electronic components; soldering and desoldering electronic components; reworking and repairing PCBs; through-hole component replacement; surface-mount component repair; point-to-point and wire-wrap construction and repair; rewinding transformers; repairing high-voltage electronic systems; replacing obsolete electronic components; substituting obsolete components while maintaining original functionality; reverse engineering electronic circuits; reconstructing obsolete electronic circuits; programming, reading and replacing EPROMs and microcontrollers; repairing and modifying analogue and digital control systems; testing and repairing analogue and digital sensors

Electro-mechanical systems: diagnosing and repairing motors; maintaining different motor types and drive systems; rewinding motors; repairing mechanical switches and mechanisms; fabricating replacement mechanical components; repairing cams, gears and mechanical linkages; maintaining electromechanical control systems; integrating mechanical and electronic components; fabricating replacement parts for obsolete mechanisms

Lighting systems: maintaining and repairing lighting systems; repairing neon lighting; fabricating neon tubes; maintaining specialist lighting systems; replacing obsolete lighting components; repairing and maintaining lighting control systems; setting up and calibrating lighting systems

Control, communication and synchronisation: configuring a series of communication protocols and standards such as DMX systems; configuring MIDI systems, working with serial communication protocols, configuring RS232, GPIO and OSC systems; connecting and troubleshooting communication between devices; programming or modifying control systems; building electronic sequencing systems; repairing relay, cam and ring-counter sequencers; synchronising multiple devices and systems; recreating obsolete control systems

Slide projection and multi-image systems: maintaining and repairing slide projectors; servicing mechanical projector components; servicing electronic projector components; replacing projector components; selecting and installing appropriate projection lenses; mounting and aligning projectors; setting up multi-projector

installations; synchronising multiple projectors; maintaining slide-tape and computer-controlled projection systems; recreating obsolete multi-image projection systems

Film handling, reproduction and preservation: handling and inspecting motion-picture film; cleaning film; winding and rewinding film safely; repairing film and film splices; preparing film for reproduction; operating film winding and inspection equipment; using densitometers and colour analysers; preparing film for photochemical reproduction; preparing film for scanning; operating film scanners; calibrating film scanning equipment; creating preservation copies; managing digital-intermediate workflows; preparing film for digital migration; managing film sound reproduction and migration

Film projection and display: maintaining film projectors; repairing mechanical projector systems; repairing projector electronics; maintaining projector sound systems; maintaining and replacing projector lenses; aligning projection systems; synchronising multiple projectors; fabricating projector synchronisation systems; fabricating and maintaining film loopers; setting up optical and digital sound systems; maintaining and configuring sound decoders; troubleshooting projection and playback systems

CRT and legacy display technologies: repairing CRT displays; calibrating CRT displays; testing CRTs using specialist equipment; using CRT testers and rejuvenators; using degaussing equipment; repairing CRT display electronics; replacing obsolete display components; repairing and calibrating CRT projectors; repairing obsolete plasma displays; repairing legacy digital projectors; maintaining obsolete media players; installing and aligning legacy display technologies

Video playback and digitisation: handling and preparing video tape; cleaning and maintaining video tape; maintaining and repairing video decks; repairing obsolete media players; maintaining legacy capture systems; configuring analogue video playback systems; configuring digital video playback systems; digitising analogue video; capturing interlaced video correctly; converting between analogue and digital video signals; managing colour-space conversion; troubleshooting video signal paths; managing video codecs and compression; migrating video between formats; using specialist software and command-line tools for video preservation; recovering content from obsolete video systems

Digital and software-based media: imaging digital storage media; using write blockers; recovering data from obsolete storage media; creating disk images; managing legacy operating systems; maintaining historic computer hardware; maintaining legacy software environments; reconstructing historic software environments; recompiling historic software; migrating software to supported platforms; creating virtual machines; using emulation to recreate obsolete environments; containerising software environments; preserving interactive and software-based artworks

Web-based and networked media: reconstructing obsolete web environments; maintaining legacy browsers and plugins; recreating historic web functionality; capturing web-based artworks; crawling and recording web content; creating and working with WARC files; using web preservation tools; reconstructing obsolete server environments; preserving web-based interactive works

Audio systems: maintaining analogue audio equipment; repairing analogue audio equipment; maintaining digital audio systems; configuring audio signal paths; setting up multi-channel audio systems; calibrating audio systems; digitising analogue audio; troubleshooting audio playback; configuring networked audio; working with analogue and digital audio formats; using sound-level meters and audio diagnostic equipment; maintaining obsolete audio playback equipment

Installation and systems integration: installing time-based media artworks; connecting different hardware and software systems; configuring complete playback systems; integrating audio, video, lighting and mechanical components; synchronising multiple systems; calibrating installations; troubleshooting complete installations; reconstructing artist-specific technical configurations; fabricating/adapting replacement components; setting up artworks for exhibition; maintaining installations during exhibition; working with hybrid works

Performance art: documentation and recording of performance works; conservation and stabilisation of physical materials used in performance; installation and re-installation of performance works; working with performers, dancers, musicians, composers, and other practitioners to support re-performance; technical set-up, maintenance, and troubleshooting of performance and sound equipment; preservation and re-creation of ephemeral and time-dependent aspects of performance

Wooden objects, frames and gilding

Wooden objects conservation: conservation and repair of historic wooden objects, (including social history and world cultures collections, composite wooden objects, maritime objects and ship models); wood structural repair; consolidation of wood; treatment of cracks in wood; treatment of splits and deformations in wood, and replacement of missing elements; treatment and stabilisation of pest and insect-infested wooden objects.

Polychrome and decorated wooden surfaces: Treatment and consolidation of painted, polychrome and decorated wooden surfaces; repair and integration of damaged or missing decoration; replication of historical decorative techniques.

Marquetry, parquetry and veneers: repair and replacement of damaged or missing elements; treatment of lifting, detached and damaged veneers; consolidation and integration of repairs with existing patterns and surfaces; treatment and stabilisation of pest and insect-infested in wood.

Gilding and gilded surfaces: preparation of substrates for gilding; gesso and bole preparation and application; water and oil gilding; gilding on wood and glass; consolidation, repair and integration of damaged or missing gilded areas; surface finishing.

Gesso, composition and decorative modelling: preparation and application of gesso and composition; modelling and replication of ornament; repair and integration of damaged or missing decoration; wet gesso techniques, including tooling, hassling and fluting.

Lacquer and japanned surfaces: identification and treatment of East Asian lacquer, European japanning and South American lacquer; cleaning of lacquered surfaces; stabilisation and repair of lacquered surfaces; treatment and integration of losses and damaged decoration, including carved, incised and decorated lacquer such as Bantamwork/Coromandel.

Frames: construction, repair and reproduction of historic frames; woodworking and carving; joining, shaping and assembling timber; replication of profiles, mouldings and carved ornament; structural repairs, consolidation and reconstruction of losses; preventive framing, including build-ups and glazing.

Decorative surface techniques and finishing: conservation of punchwork, crosshatching, sgraffito, pastiglia and other historical decorative techniques; replication of surface textures; tonal integration, finishing and distressing of repairs to match existing surfaces.

World cultures collections

Culturally sensitive and community-informed collections care: Identifying culturally sensitive objects and materials and applying relevant cultural protocols; adapting handling, storage, display and conservation procedures to cultural requirements; working with source and diaspora communities, artists, makers and cultural practitioners; facilitating culturally appropriate access, consultation, examination and photography; incorporating community and traditional knowledge into condition assessment and conservation decisions; recognising culturally significant wear, repairs, residues, alterations and continued use as part of an object's life; working with sacred, ceremonial and restricted objects, including human remains and objects containing human materials; supporting culturally appropriate treatment, care, repatriation, return and transfer of objects

Organic and plant-based materials: conservation of wood and carved wood; conservation of bark and barkcloth; conservation of basketry; conservation of woven, plaited and coiled plant materials; conservation of grasses, reeds, palm and other fibres; conservation of gourds and seeds, stabilisation of splits, breaks and structural weaknesses; consolidation of fragile organic materials; repair and support of plant-based structures; humidification and reshaping of plant-based materials

Animal-derived materials: conservation of leather and skin; conservation of scales, feathers or spines; conservation of fur and hair; conservation of feathers; conservation of bone; conservation of horn and antler; conservation of shell; repair and consolidation of fragile animal-derived materials; treatment of pest-damaged materials; reattachment of detached elements

Textiles and fibre objects: conservation of woven and non-woven textiles, conservation of plaited and braided structures; conservation of dress and accessories; stitching and support techniques; stabilisation of weak and fragmented fibres; support of decorated and composite textiles; repair of tears and structural damage

Inorganic materials: conservation of ceramics; conservation of stone; conservation of metals; conservation of glass; fragment joining and reconstruction; consolidation of friable materials; corrosion assessment and stabilisation; mechanical cleaning, repair and structural support

Painted and decorated surfaces: conservation of pigments and painted surfaces; consolidation of flaking or friable decoration; cleaning decorated surfaces; stabilisation of lifting surfaces, treatment of coatings and surface finishes

Composite objects: identifying interactions between different materials; assessing differential movement and deterioration; developing treatment strategies for mixed-material objects; stabilising joins between different materials; designing structural supports for composite objects; treating objects where intervention in one material may affect another