Preventive Measures for the Safeguard of Cultural Heritage in the Event of Armed Conflict

Fabio Maniscalco*

Abstract


1. Introduction**

Anyone who lives in a zone at war risk has little difficulty in working out whether war is imminent; the recent crisis in Iraq, for example, was heralded by a lengthy diplomatic controversy accompanied by accusations and threats between USA and Iraq. In these circumstances it is the task of conservationists and museum, archive and library heads to put a protection system in place to safeguard cultural heritage from the dangers of a potential conflict.

The present article illustrates general preventive measures and first steps for the safeguard and conservation of cultural property in the event of armed conflict. These measures should be joined by further action specifically taking into account the features and location of the cultural property to be protected.

It is fairly obvious that in order to put in place safeguarding operations of cultural property or sites timely and effectively it would be useful in peacetime to draw up specific guidelines for personnel charged with the task of protecting cultural property, to plan the action to be taken and procedures to be followed as well as providing the materials and staff necessary should any conflict or attack arise.

2. Protection measures for cultural property against risks not directly dependent on the use of weapons

Risks independent of the direct use of arms against cultural property vary according to the geomorphologic and climatic conditions of the site where conflict arises and the changes that this conflict may bring to the cultural property itself (e.g. static shifts or the destruction of roofing and windows due to the effect of explosions). Specific action can avoid or at least limit the mechanical, physical, chemical, biological and anthropogenic damage arising from defence systems which have been ill-thought out and/or put in place by inadequate and unskilled personnel.

* Director of the “Observatory for Protection of Cultural Heritage in Areas of Crisis”.

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2.1. Immovable cultural property (historical buildings, monuments, archaeological and cultural sites)

During armed conflict certain conditions, such as raids by crowds or armed groups, bombardment or fighting in town centres, lead to the abandon and decay of cultural property. Thus, before safety levels increase or changes to the political-institutional situation come about, historical buildings, monuments and cultural and archaeological sites may be exposed, even months or years, to mechanical, physical, chemical-biological and anthropogenic risks. Preventive defence action for immovable cultural property should comprise adequate protection systems, and above all, regular checks and conservation action performed by skilled personnel, carefully selected and trained to perform those tasks in peacetime.

2.1.1. Walls

During conflict, ‘indirect’ risks to walls and roofing may derive from damage caused by weapons and/or vandalism. Thus, for prevention purposes, certain procedures to protect buildings should be set up in peacetime, including:

- drawing up an ‘emergency plan’ comprising:
  - detailed action schemes regarding the preparation of protection systems and/or the shielding of immovable cultural property,
  - materials and tools to be used,
  - details of personnel responsible for setting up protection systems,
  - the name of the operations head;
- setting up the protection systems and/or shielding according to action schemes set out in the ‘emergency plan’;
- organising regular drills in peacetime to practice putting protection systems into operation;
- walling up any building entrances the surveillance of which cannot be guaranteed during conflict.

2.1.2. Architectural decoration

During conflict the main ‘indirect’ risks to architectural decoration depend on badly set up protection systems and missing roofing, doors and/or windows. In the first instance mechanical damage to the artefacts may occur; in the second case, changes

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2 See Maniscalco 2007, 15-56.
to temperature, humidity, air circulation, water infiltration and particle sedimentation parameters may mean that the artefacts are damaged or altered by physical, chemical and mechanical phenomena.

Safeguarding activity of architectural decoration should include setting up protection systems carried out according to procedures perfected in peacetime. In addition, during and/or immediately after conflict, the protection of architectural decoration can be assured with regular inspection and activation of the following:

- securing sculptures and architectural decorations detached from the wall or from the main sculpture group following explosion or other causes and run the risk of being damaged on the ground;
- covering the architectural decorations with whatever means available (depending on climatic conditions and availability) to ensure that rain, wind, sand or particles penetrating through broken roofing, openings or lesions do not damage the artefacts themselves;
- verifying any appearance of water percolation and/or humidity lines;
- controlling the state of conservation of the pins (metal or other material) used to anchor heavy and bulky decorative elements or sculptures jutting out. Blasts and/or lengthy exposure to humidity or freeze-thaw events may compromise mechanical hold;
- removal of cobwebs, dust, animal droppings (e.g. pigeon droppings) or sediments from the surface of the artefacts with a soft, dry cloth. This activity, conducted at regular intervals, when the layers of dust and sediment are not yet fixed deposits has no damaging side effects on the artefact, even though it may not be in a perfect state of conservation;
- removal of invasive plants with the aid of restorers.

### 2.1.3. Murals, plaster and mosaics

Murals, plaster and mosaics cannot be removed, apart from exceptional cases and with complex and costly tools and techniques; thus they are particularly vulnerable to ‘indirect’ risks deriving from armed conflict: mechanical risks – due to badly set up protection systems or wall support failure – and chemical-physical risks – due to variations in temperature, humidity and air circulation and/or biodeterioration parameters.

The safeguarding of murals, plaster and mosaics should be guaranteed by certain activities carried out with standard procedures and defined in peacetime. In addition, experts trained during and/or immediately following conflict should:

- check for humidity and identify causes – to reduce its effects or eliminate it;
• test the plumbing of adjacent rooms or buildings;
• inspect gutters and drains for inflow and outflow of water running down the outside surface behind the fresco or plaster – to stop them getting blocked or to repair any broken pipes;
• examine the state of conservation of the structures offering protection (cornices, parapets, etc.) should the plaster or murals be located outside (e.g. cloisters);
• repair damaged roofs, window panes and/or windowframes and prevent infiltration of rain, snow, hail and/or particles with whatever is on hand;\(^3\)
• check for climbing plants and where possible promptly remove;
• keep birds and rodents away (inside and outside) with pest control systems;
• regularly remove (at least every two months) particle deposits from all overhanging elements (beams, window sills, etc.) or where access is difficult (e.g. upper areas of iconostases, tabernacles, pulpits), in order to avoid dirtling murals or mosaics;
• gently dust cobwebs, dusts, animal droppings (e.g. pigeon droppings) or particles with a soft, dry cloth (or a feather duster or soft brush), but only if the sediment layers are not fixed deposits;
• remove any waste accumulating close to murals or wall mosaics;
• collect and keep any fragments of paint film or mosaic tiles that may have fallen;
• check that the areas in which murals or frescoes are located are not earmarked for improper use;
• protect frescoes and wall mosaics with a frame of metal or wooden tubes and sandbags;
• should there be a risk of collapse, place polyurethane foam panels or wool or foam-rubber mattresses or sacks of feather and down, foam-rubber pieces or straw on the floor to avoid excessive crumbling of fragments of the murals on impact with the ground;
• prepare a complete and detailed photographic record of the mural or mosaic to provide a starting point in case of collapse.

2.1.4. Window panes

The intrinsic fragility of glass artefacts exposes them particularly to decay produced by

\(^3\) The correct use of plastic sheets is useful to repair, temporarily, damaged roofs, windows panes and/or windowframes.
the freeze-thaw phenomenon, condensation, glass lichen, etc. Thus, during conflict panes should be removed and kept in a safe place or if left in place should undergo regular inspection. In actual fact, rapid temperature change and/or vibrations (blasts, etc.) may damage or deform the lead framework causing the panes to crack or collapse.

3. Prevention and protection from risks depending on the use of weapons

General protection measures should be put into place promptly and efficiently, taking into consideration the characteristics of the armaments available to the warring factions.

This section describes general measures to safeguard immovable cultural property from the risks deriving from the use of arms. Ideally, a specific plan should be drawn up in peacetime for each immovable property with a list of procedures and materials needed in time of war.

The first crucial step is to protect monuments and cultural sites immediately against risk from blasts and shrapnel produced by explosions and light individual weapons and fires - protection which does not exclude the subsequent adoption of more specific and adequate safeguarding measures.

General measures, indispensable for safeguarding a historical building, monument or cultural site must possess certain features which are useful in avoiding or limiting damage from ‘direct’ or ‘rebound’ blasts (fig. 1), from fragmentation and fire: solidity (to resist vibrations caused by explosions), impenetrability to bullets/projectiles and shrapnel, non-inflammability, non-combustibility and elasticity.

3.1. Immovable cultural property (historical buildings, monuments, cultural sites)

In wartime, immovable cultural property is particularly exposed to the risks deriving from the use of arms, especially if located close to ‘sensitive targets’ (e.g. industrial areas, airports, railway stations or important roadlinks) or des-
tined for strategic-military use. The only measure which can safeguard immovable cultural property in wartime is the setting up of adequate protection systems.

- **Protection systems for walls (fig. 2)**

**External walls**
- With conventional walls, less than 50 cm thick, sandbags at least 3 m high and 1 m thick should be used to increase width.
- Where necessary buttresses should be applied to outside walls.
- Valuable framework and any sculptures (especially if jutting out) located on outside walls should be removed or protected by a layer of sandbags.
- Clear plants, leaves and grass from adjacent gardens.
- Put speed humps in place on access roads to the building to prevent terrorist attacks with car-bombs. They should cover at least 100 m from the entrance and be not less than 120 cm wide and 7 to 10 cm high.
- The ‘Blue Shield’ emblem recommended by The Hague Convention of 1954 should be placed on all sides of the building as well as the roof.

**Internal walls**
- The number of access points (doors and windows) should be reduced, with less important entrances bricked up (minimum thickness 50 cm) or closed up with sandbags (minimum thickness 80-100 cm).
- Each access door should be protected with a wall (minimum thickness

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2. Immovable cultural heritages, external. Main protective measures, against “direct risks”: A) Speed humps, to prevent terrorist attacks with car-bombs; B) Wall (with bricks or sandbags) in front of the entrance; C) Walls (with bricks or sandbags) on the windows; D) The ‘Blue Shield’ emblem recommended by the 1954 Hague Convention; E) Clear plants, leaves and grass from adjacent gardens.
50 cm, with bricks and 1 m with sandbags). The wall should spread out from both sides of the opening for a length equal to or exceeding the distance from the door.

- If necessary new brick partitions or wall-props should be constructed.
- Specific arch and ceiling protection should be built against blasts (figs. 3-4).
- Corridors should be broken down to smaller lengths with brick walls or sandbags to slow down blasts and stop shrapnel – should an explosion occur inside the building.
- Valuable framework should be removed or protected with sandbags (figs. 5-6).
- Inflammable material (furniture, archives, etc.) should be removed as much as possible, transferred to inner rooms with no external access.
- A layer of sand (20-30 cm) should be spread on floors to soften the blows from aerial bombardment or bombing and, crucially, to limit fire risk. If possible, sheets of plastic may be laid down and covered with cement to safeguard floor mosaics or particularly valuable floors.
- Fire alarms put in place during peacetime should be checked.
- All personnel should be trained to deal with fires.
- A video-photographic inventory should be carried out inside and outside as well as any particulars of architectural decoration. They should be kept safe and might be useful for future conservation or post-war reconstruction.

- **Roofing**
  - After verifying the state of conservation and the static condition of the building, shield systems or nets capable of stopping, slowing down or deviating bombs and missiles launched from mortars or howitzers should be put in place.
  - Special substances should be applied to flameproof the wood of the roof or attic.
  - Inflammable materials (e.g. wooden chests) should be removed from roofs and attics.

- **Murals**
  - If the static condition of the building allows, murals should be protected with brick partitions or sandbags to block shrapnel, bullets and/or projectiles.
  - On the floor below, with murals which are difficult to shield with protection systems (e.g. frescoes on arches or ceilings), polyurethane foam panels or

5-6. Naples, Churches of “S. Anna dei Lombardi” and of “S. Lorenzo Maggiore”, valuable frameworks protected with sandbags, during the Second World War.
wool or foam-rubber mattresses should be placed, or even sacks of soft improvised materials (e.g. feathers, foam-rubber chips, straw), to prevent the breaking apart of fragments of the paintings themselves should they fall to the ground.

- A complete photographic record of the murals should be made.

- **Architectural decoration**
  Architectural decorations exposed to damage from weapons are normally located outside. The most valuable decorations, from a historical-artistic point of view, should be moved to a safe place, providing that this presents no risk of mechanical damage, or protected with a layer of sandbags or an improvised ‘emergency’ defence system (fig. 7).

- **Glass panes**
  Preventive protection of glass panes includes their removal and safekeeping in a secure storage facility or in the same building. Safeguarding activity of windows and panes left in place includes:
   - Shielding with a sandbag wall at least 80 cm thick, or bolting them between two metal or wooden sheets.
   - Elasticise the glass – which could damage objects and cause injury on fragmenting – with plastic or cellophane sheets attached to the windows, several layers of paper sheets glued to the panes (with gum arabic and glycerine or a mixture of improvised adhesive such as water, flour and vinylic glue) or even parcel tape. Alternatively the glass could be covered by a fine metal grill (approximately 1 cm).

### 4. Sandbags

In earlier paragraphs the use of sandbags to protect cultural property from damage produced by shrapnel, bullets, projectiles and fire has been mentioned often.
Sandbags, normally used by the military to set up an ambush or defence position, have proved extremely useful for the protection of cultural property in wartime (fig. 8) - in particular during the Second World War (figs. 9-11). Several systems are available (brick walls, concrete blocks, steel sheeting, etc.) to protect cultural property from blasts and the consequences of fragmentation – effective also in blocking or slowing down bombs, bullets and projectiles fired from light arms or even tanks. Nevertheless, the best protection, in terms of simplicity, cost and versatility, must be sandbags – supported by metal tube-frames. Precautions for use include:

- making sure that the floor or ground surface is capable of bearing the weight of a defence structure made up of sandbags;
- filling bags with dry sand, if possible, especially to protect murals, sculptures and/or wooden architectural decoration;
- using sand or soil from an area as close as possible to the building to be protected;
- filling bags with gravel, stones and/or rubble (broken up to make the sack more flexible) if no sand or soil is available;
- filling the bag three-quarter’s full to make it more flexible and easier to combine with other sandbags;
- pressing down the soil/sand before use;
- placing the bound side of the sandbag towards the inside of the structure or covering it with another sandbag as it could easily catch fire from burning shrapnel or special ordnance;
- the most common sandbag measures 50 x 25 x 13 cm when full. If necessary, though, any improvised sandbag may be used (jute sacks, bags, pillow cushions, mattress covers, plastic bags, etc.);
- placing a corrugated iron (preferable) or plastic sheet above the sandbag stru-
9-11. Sandbags have proved extremely useful for the protection of cultural property, in particular during the Second World War.
structure to protect the structure itself from rain or water infiltration. To support and/or reinforce the sandbag wall a tubular iron or wood frame should be built in which the space between the parts of the frame should diminish (upwards) to no less than 1 m at its highest point. At the bottom of the sandbag protection a gap not exceeding 30 cm should be left to allow the passage of air between the cultural property to be protected and the structure itself and to prevent the bags from absorbing water from rainfall infiltration, capillary rise, broken pipes or flooding. If no tubing is available, simple support stakes may be used – placed every 50 cm inside, behind and in front of the sandbag wall (fig. 12). If necessary, depending on the cultural property to be protected and its location, a strong metal grid or board should be placed at some 20-30 cm from the outside wall of the sandbags. This provides improved defence from rockets or shaped charge projectiles. To fill the bags rapidly a ‘slide’ technique should be adopted (fig. 13), needing three people: one to shovel the soil onto a sloping corrugated sheet; one to hold the bag on the bottom of the sheet to guide the soil into the bag; one to close up the bag.
As a rule three people should be capable of filling 60 bags an hour; in this way in just over two hours it should be possible to build a wall 2 m high and 1 m thick. To build a protective wall the sandbags should be built up in layers, taking care to alternate one layer at right angles to the artefact with one layer parallel. When materials are unavailable and/or time is too short to build an adequate protection system an emergency system to reduce the effects of explosions and light arms must be adopted. The most effective improvised barriers include piles of soil, sand and/or rubble with the aid of an earthmover and/or shovels; piles of tyres or metal barrels filled with sand, soil, stones and/or rubble; wrecked cars or electrical appliances; furniture and wood. In the early 1980s protection systems were successively adopted in the National Museum of Beirut made up of boxfuls of cement placed around wood shielding (fig. 14).


Because the “protection system” in wood is inflammable, it does not be lean on the frescoes or cultural items.
5. Fire prevention and protection

5.1. Fire prevention

Fire prevention comprises procedures and measures to reduce the possibility of triggering combustion and, should a fire break out, to block combustion and prevent the flames from spreading.

In zones at risk from war preventive action should be based on detailed planning, which analyses the location and exposure of the building, the materials the building is made up of, the composition and quantity of artefacts the building holds and all the variables which might interact in the early stages and development of a fire.

In addition, any eventuality must be assessed, such as the possibility that saboteurs or explosions may damage or destroy water pipes, useful for putting the fire out, or that fire-fighters are delayed, roads are closed – bombed or shelled – with the added danger of snipers or fighting in the area involved.

During civil war the main fire prevention measures for historical buildings and monuments are basically the same as peacetime measures: electrical systems made according to recognised standards; lightning protection (lightning conductors or Faraday cages); earthed metal parts of tanks, silos and pipes containing or near combustible or inflammable substances; use of non-combustible materials and spark-proof floors and tools; training and drilling of fire protection personnel.

A crucial factor is also a system of ‘active prevention’, involving automatic fire alarms (linked to optic and/or acoustic warning systems perceptible in the areas under surveillance) as well as equipment to disperse smoke and heat – capable of acting promptly on the source and/or reducing the spread of fire in the area.\(^5\)

If possible, self-extinguishing materials should be placed in exhibition areas to reduce the ‘fire load’, which represents the density of potentially inflammable material in a building and is one of the main parameters adopted to quantify the degree of fire risk in any zone.\(^6\)

During international or multinational war explosive ordnance and/or missiles can destroy or damage water and power supplies. Thus, besides an adequate anti-fire water protection system it is worth placing a portable fire extinguisher every 100 m\(^2\) and make plans for collecting water (e.g. pools or tanks). The agents used for extinguishing fire should be compatible with the cultural property housed in the building.

\(^5\) Bryan 1974.

At the first hint of conflict all artefacts made up of organic material and easily inflammable should be quickly moved from display or consultation (libraries and archives) areas to storage facilities – organised so as to reduce the ‘fire load’. Display fittings of no historical value and made up of inflammable material should be removed or used for emergency protection.

Although in peacetime any activity within the museum, library, archive or monument should be under strict discipline and despite the fact that flames, stoves, gas heaters, open electric heaters, paraffin heaters and unprotected heated appliances should be avoided, as well as stores of substances which may lead to fire or explosion, it might happen that museum or library staff are forced to barricade themselves in for their own protection and thus make use of those very tools to be avoided. In those circumstances logistic activity should be restricted to very few areas, at some distance from the storage facilities and containing extremely small ‘fire loads’.

5.2. Fire protection

Fire protection comprises a series of ‘active’ and ‘passive’ measures aimed at limiting fire damage.

‘Passive protection’ needs neither special staff nor equipment. It essentially means:

- placement of ‘barriers’ – e.g. open spaces, safe distances, flameproof walls, shields, compartmentalisation, etc. – between potential fire risk areas;
- construction of structural elements (walls, pillars, girders, etc.) equipped with ‘fire resistance’ properties proportionate to fire loads. Fire resistance is a parameter which represents the length of time (in minutes) that an element retains its mechanical stability, integrity and insulation;
- ample use of self-extinguishing materials according to the ‘fire reaction’ classification, which expresses the tendency of a material to break down and feed the fire on the basis of four parameters: inflammability, flame spread rate, mass loss rate and heat release;
- the setting up of adequate evacuation systems, capable of ensuring safety.

‘Active protection’ measures detect, warn about and extinguish fires and require skilled personnel and/or particular equipment. In wartime the most useful ‘active pro-

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7 The average “fire load“ per sq./m in the Deposits/refuges does not exceed 50 kg of “wood equivalent”.

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tection’ measures to safeguard museums, libraries, archives and monuments are:

- automatic detection systems (flames, gas, heat and/or smoke) and alarms, which keep a determined area under control and warn of any fire or fire source with an acoustic or visual warning device. Despite these measures, in the immediate aftermath of bombing or shelling, prompt action by trained and skilled personnel to secure the area would be wise;

- automatic fire extinguisher systems, which differ according to the substance used: water sprinkler system (wet pipe, dry pipe, alternative systems, pre-alarm, flood systems, etc.); foam system; carbon dioxide system; dry powder system; alternative to halon systems;

- smoke and heat dispersers, which transfer the mass of gas produced by fire outside;

- the fire protection water system, comprising fire-hoses and/or hydrants permanently connected to the water supply. Nevertheless, it would still be worth setting up a separate water-tank to ensure that the system continues to function even when pressure is low or the water supply itself fails;

- portable fire extinguishers (lighter and handier) or mobile units (equipped with greater force), which are the most popular means of firefighting in terms of emergency action and are extremely useful when the water supply fails. For correct use each extinguisher bears the class of fire for which it may be utilised as well as the ‘extinguishing capacity’ (with an alphanumeric code, e.g. 8A-55BC). In historical buildings and monuments extinguishers should be in full view, away from any heat source and close to escape routes. When in use operators should be careful to stand with their backs towards an obstacle-free exit and to aim the nozzle towards the base of the flames (keeping a distance of some 2 m from the fire).

To extinguish a fire it is necessary to eliminate one of the three elements whose presence gives rise to combustion: the combustible, fuel and trigger source. This objective may be reached by ‘cooling’ (reducing the temperature of the heat source below ignition temperature), by separating the combustible from the fuel (by means of jets of water, sand, mechanical means, fireproof barriers, etc.), ‘asphyxiation’ (meaning the separation of the combustible from the fuel with foam, etc.) or ‘chemical reaction’ (through the emission of substances capable of stopping the chain reactions which occur during a fire). In addition, prompt action is crucial so that the temperature is not allowed to reach “flashover point”.

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The main fire extinguishing substances to be utilised on the basis of the nature of the combustible and the size of the fire are:

- Water. The most common, cost-effective and effective means of extinguishing a fire of combustible solids. It should not be adopted if light inflammable liquids are involved, such as petrol, to avoid their spreading and the consequent increase of the surface on fire.

- Foam. Made up of a solution of foam in water, it is effective with class A and B fires. It should not be used on live electrical appliances, on toxic substances (e.g. cyanide, chlorine, fluorine), on substances which react violently with water and which may be contained in special ordnance (e.g. sodium, magnesium, aluminium, sulphuric acid).

- Dry powder. This consists of a powder which is directed towards the fire through pressured gas. Various types of powders exist and can be used to extinguish class A, B, C and E fires.

- Inert gases. To extinguish fires in closed areas carbon dioxide (CO₂) and nitrogen (N₂) are generally used. The former, particularly adapted to live electrical circuits, rapidly cools down and stifles the fire separating the combustible from the fuel (oxygen). The temperature of the carbon dioxide jet is approximately 80 °C below zero, which means that it can easily cause damage to delicate artefacts or injury.

- Halogenated hydrocarbons (halons). These are halogenated compounds which contain fluorine (F), bromine (Br) or chlorine (Cl) within their molecules and slow down and extinguish chemically the combustion process ('negative catalysis'). Since 1999 they have no longer been in use both because they free toxic gases and damage the ozone layer.

- Extinguishing agents as an alternative to halons. Made up of halogenated hydrocarbons, provide a balance between the extinguishing capacity of halons and the safeguarding of the environment.

In potential warzones where museums, libraries, archives and historical buildings and monuments are closed to the public, evacuation problems in the event of fire are reduced to a minimum. Safety management and emergency fire procedures should be entrusted to a technical fire-safety officer whose task, especially during the critical phases of conflict, is to check the efficient running of firefighting systems and the working of ventilation, conditioning and heating systems. In addition, the fire-safety officer should identify an adequate number of personnel, in relation to the size and features of the building, trained to act directly in the event of an incident and capable of bringing the fire under control. Finally the fire-safety officer should keep an updated file on the plans of each and every device and system.
throughout the building, including pipes, drains and sewers located close to the building itself.

In the event of an incident the fire-safety officer and staff should act according to standard procedure laid down in the ‘firefighting action plan’ – drawn up in peacetime and tested with regular fire drills. If the museum collections or movable cultural property have not yet been moved to a safe store/shelter, the personnel should know exactly which property to move, where to move it and how.

<table>
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<th><strong>Fire Classes</strong></th>
<th><strong>Materials</strong></th>
<th><strong>Extinguishing Substances</strong></th>
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| **A** | Fires that involve flammable solids such as wood, cloth, rubber, paper, and some types of plastics | • Water  
• Foam  
• Polyvalent Powders  
• Carbon Dioxide CO₂  
• Extinguishing agents as an alternative to halons |
| **B** | Fires that involve flammable liquids or liquefiable solids such as petrol/gasoline, oil, paint, some waxes & plastics, (not cooking fats or oils) | • Foam  
• Polyvalent Powders  
• Carbon Dioxide CO₂  
• Extinguishing agents as an alternative to halons |
| **C** | Fires that involve flammable gases, such as natural gas, hydrogen, propane, butane | • Polyvalent Powders  
• Carbon Dioxide CO₂  
• Extinguishing agents as an alternative to halons |
| **D** | Fires that involve combustible metals, such as sodium, magnesium, and potassium | • Class D Powder |
| **E** | Fires that involve any of the materials found in Class A and B fires, but with the introduction of an electrical appliances, wiring, or other electrically energized objects in the vicinity of the fire, with a resultant electrical shock risk if a conductive agent is used to control the fire. | • Foam *(sometimes)*  
• Carbon Dioxide CO₂  
• Dry Powder  
• Extinguishing agents as an alternative to halons |

*European Fire extinguisher classification*
6. Emergency action to safeguard cultural property

In wartime it is inevitable that the cultural heritage becomes, either purposely or accidentally, a ‘target’ for the warring factions. Emergency action is crucial to the preservation of the cultural property to remedy any damage suffered and to the protection of the property to ensure that the damage does not worsen due to mechanical, physical, chemical-biological or anthropogenic effects.

Article 7 of the 1954 Hague Convention,\(^8\) paragraph 2, provides for the establishment of specialised personnel in the armed forces of the contracting parties, whose task is “to secure respect for cultural property and to co-operate with the civilian authorities responsible for safeguarding it” in wartime. Despite attempts to employ qualified military personnel in the protection of cultural property in crisis areas, however, not one army has respected this article. And yet the employment of personnel specialised in safeguarding cultural property and equipped with photographic and video capture technology is fundamental in times of war in order to:

- take prompt action to block theft, looting and illicit excavation of cultural property;
- collaborate with local authorities in planning and putting into practice conservation and protection works to safeguard movable and immovable cultural property;
- provide surveillance to prevent international trafficking of cultural property.

Thus, it is quite clear that among the various tasks designated to a military action team to protect cultural property, surveillance of museums and libraries must be included. This would certainly prevent any further disgraceful episodes such as the raids on the museums of Kosovo\(^9\) and Iraq.\(^10\)

Military action teams should also be involved in supervising and activating the transport of cultural property to a safe place and making sure that the military personnel itself does not smuggle cultural property out of the country of operations.

Ideally, emergency action to safeguard cultural property should be agreed upon by all parties in conflict, both to guarantee the safety of the personnel involved and to prevent any reprisals against the property itself – as occurred in Kosovo, for example. The team involved in emergency operations should include at least one qualified engineer specialised in the complexities relating to static shift in crisis areas; an architect and cultural property conservationist (archaeologist or art historian) both

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\(^9\) See Maniscalco 2000, 6-7.

experts in the field of architecture and art history in the area in question; one or more public officials responsible for the protection of the cultural property in the area in which the team is in action; a camera operator; photographer; activity coordinator in the form of a ‘disaster manager’ specialised in the protection of cultural property in warzones; a coordinating officer – from the ranks of local police or military or even the multinational force – capable of guaranteeing the safety of the team involved in the transport and protection of cultural property.

6.1. Emergency action

Emergency action to safeguard cultural property should be carried out in conjunction with local police and/or military when conflict ends or when safety conditions allow:

- Local police and/or military, multinational contingent or armed forces of the occupying state
  - Depending on the political-institutional situation of the area in which war is being or has been fought, place armed personnel on guard at museums, libraries, archives and, if required, to guard cultural property of ethnic groups or defeated or minority factions. In this way it should be possible to prevent the risk of property stripping and/or destruction not unlike the episodes in the Federal Republic of Yugoslavia and Iraq, where limited and late action of the various armed forces allowed a good deal of the cultural and religious wealth to be devastated (figs. 15-16).
  - Inspect each and every item of baggage belonging to departing military personnel (on leave or on completion of the mission) to limit the risk of illegal exportation of cultural property.
  - Increase customs controls to prevent illegal exportation of movable cultural property on the part of civilians.
  - Organise patrols along borders to block illegal exportation of cultural property.
  - To avoid collapse or further lesions within historical buildings and/or monuments compromised in war, reduce transit of heavy vehicles (tanks, armoured carriers, lorries, etc.) close to the buildings themselves.
  - Should limiting heavy vehicle traffic prove impossible, reduce speed limits close to statically damaged historical buildings or monuments.
  - Plan regular as well as surprise inspections to check that surveillance staff in museums, libraries, archives or storage facilities are doing their duty and not stealing cultural property.
In the Federal Republic of Yugoslavia (15) and Iraq (16), limited and late action of the various armed forces allowed a good deal of the cultural and religious wealth to be devastated.

- Plan checks, to be carried out by Bomb Disposal teams, in gardens, parks and flowerbeds, on roofs, terraces and balconies and on movable cultural property to identify and remove any mines, bomb traps or unexploded ordnance (e.g. submunitions of cluster bombs).

○ Emergency team specialised in safeguarding cultural property
- Plan (in collaboration with heads of cultural property protection and local scholars) the collection of all records regarding immovable cultural property: old news items, archive documents, publications, photos, catalogue entries, maps and plans.
- Monitor the state of conservation of immovable cultural property, according to priorities set out at the start of the mission and draw up individual records for the areas at risk of war. These records should list the features of the property, any damage suffered during conflict and subsequent risk assessment as well as possible action strategies (see figs. 17 and 18).
- Identify mode and priority for conservation and reconstruction action.
- Set up emergency work to repair roofs, windows and entrances to immovable cultural property damaged by explosion. In the absence of funding, means and/or time, cover the roofs and substitute doors and windows with plastic covers, metal sheeting or improvised materials.
<table>
<thead>
<tr>
<th>LOCALIZZAZIONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denominazione del Museo/Collezione</td>
</tr>
<tr>
<td>Stato</td>
</tr>
<tr>
<td>Frazione</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Scheda dei Beni Culturali Mobili nelle Aree a Rischio Bellico</th>
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<table>
<thead>
<tr>
<th>BENEFICIO CULTURALE MOBILE</th>
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</thead>
<tbody>
<tr>
<td>Tipologia manufatto:</td>
</tr>
<tr>
<td>Autore:</td>
</tr>
<tr>
<td>Cronologia:</td>
</tr>
<tr>
<td>N. Inventario:</td>
</tr>
<tr>
<td>Descrizione:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTIZIE SUI DANNI/FURTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Danni: Sì</td>
</tr>
<tr>
<td>Data del danneggiamento:</td>
</tr>
<tr>
<td>Data certa?</td>
</tr>
<tr>
<td>2. Trasfuso: Sì</td>
</tr>
<tr>
<td>Data furto:</td>
</tr>
<tr>
<td>Data certa?</td>
</tr>
<tr>
<td>3. Responsabile presunto danni/furto:</td>
</tr>
<tr>
<td>4. Descrizione dello stato del manufatto:</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>FONTI DELLE INFORMAZIONI</th>
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</thead>
<tbody>
<tr>
<td>a. Documentarie:</td>
</tr>
<tr>
<td>b. Autorità locali:</td>
</tr>
<tr>
<td>c. Civili:</td>
</tr>
<tr>
<td>d. Testimonianze:</td>
</tr>
<tr>
<td>1. Nome:</td>
</tr>
<tr>
<td>2. Cognome:</td>
</tr>
<tr>
<td>3. Indirizzo:</td>
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<tr>
<td>4. Città:</td>
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<tr>
<td>5. Attività:</td>
</tr>
<tr>
<td>6. Disponibilità a testimoniare:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOCUMENTAZIONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Foto/video del compilatore:</td>
</tr>
<tr>
<td>b. Foto/video di altri:</td>
</tr>
<tr>
<td>c. Documenti acquisiti sul monumento:</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SITUAZIONE Durante il Conflitto</th>
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<tbody>
<tr>
<td>Custodi presenti: Sì</td>
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<tr>
<td>N. Custodi:</td>
</tr>
<tr>
<td>N. e tipo antifurti ed antintrusione:</td>
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<tr>
<th>OSSERVAZIONI</th>
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17. Individual form, about movable cultural property in war areas, created and used by F. Maniscalco during the peace-keeping missions “I.FOR” and “S.FOR”, in Bosnia-Herzegovina, and Alba, in Albania.
SCHEDA DEI BENI CULTURALI IMMOBILI IN AREA DI CRISI

LOCALIZZAZIONE

Stato __________ Città __________ Provincia __________
Frazione __________ Località __________ Via __________
Data del sopralluogo __________ Compilatore __________

MONUMENTO

Denominazione monumento __________

Cronologia assoluta __________

Cronologia relativa __________

Tipologia
• Costruzione/Complesso sacro/a □
• Costruzione/Complesso civile □
• Costruzione/Complesso privato/a □
• Cimitero □

Appartenenza Etica __________

Restauro/Rifacimenti __________

Collezioni e beni culturali contenuti nel monumento __________

MONUMENTO

I. Danni esterni: Si □ No □
   a. danni di guerra:
      1. Armi di piccolo calibro □
      2. Granate/razzi □
      3. Artiglieria □
      4. Bombardamenti □
      5. Vandalismo □
      Altro □
   b. incura □ c. incendi □

II. Danni interni: Si □ No □
   a. atti vandalici □
   b. incendi □
   c. proietti □ Altro □

III. Furti: __________

IV. Responsabile/i presunto/i danni __________

V. Responsabile/i presunto/i furti __________

VI. Data presumibile dei danni __________

VII. Situazione del circostante (giardini, strade, cortili, etc.) __________

VIII. Descrizione stato monumento: __________

FONTI DELLE INFORMAZIONI

a. Documentarie □
b. Autorità locali □
c. Civili □
d. Testimonianze
   1. Cognome: __________
   2. Nome: __________
   3. Indirizzo: __________
   4. Città: __________
   5. Attualità
   6. Disponibilità a testimoniare Si □ No □

DOCUMENTAZIONE

a. Foto/Video del compilatore: Si □ No □
b. Foto/Video di altri: Si □ No □
c. Documenti acquisiti sul monumento __________

d. “Scudo Blu” apposto sull’edificio: Si □ No □
e. Apposizione conforme al Regolamento di esecuzione della Convenzione de L’Aja del 1954: Si □ No □

SITUAZIONE ATTUALE

a. Restauri in corso: Si □ No □
b. Monumento in uso: Si □ No □
c. Luogo in cui i beni culturali mobili sono custoditi __________

18. Individual form, about immovable cultural heritage in war areas, created and used by F. Maniscalco during the peace-keeping missions “I.FOR” and “S.FOR”, in Bosnia-Herzegovina, and Alba, in Albania.
- In the absence of any inventory or catalogue, film movable cultural property within museums, historical buildings and monuments – to aid identification in the event of theft.

- When museums, libraries and/or archives are unable to guarantee secure conditions (due to the poor state of the building, strategic motives, etc.), make plans to transfer property to a more suitable and safer area. Transport should be arranged with local police and/or occupying armed forces.

- Organise regular checks on conditions in storage facilities and of the movable cultural property held there with local chiefs responsible for the protection of cultural property.

- Report any threat or abuse to cultural property by occupying or multinational forces to the international or national authority concerned.

6.2. Protection and emergency action for the safeguard and conservation of architectural decoration, paintings and wall mosaics

6.2.1. Introduction

In any emergency action to save immovable cultural property damaged in war or natural catastrophe priority must be given to collecting the rubble to recover the fittings and fragments of murals, mosaics and/or architectural elements which adorned them.

No doubt a detailed and systematic examination of the rubble would have made it possible to reconstruct, at least partially, a good deal of frescoes, mosaics and architectural decoration lost in the Second World War and during dozens of wars in the second half of the 20th Century. The pioneering exploits of the “Istituto Centrale del Restauro” – which managed to recover a number of frescoes by Lorenzo da Viterbo and Andrea Mantegna after the bombings of 1944, indicating guidelines to follow in similar situations – have rarely been equalled. Exemplary action, in terms of speed and results, occurred in the Basilica of S. Francesco at Assisi, where frescoes damaged during the 1997 earthquake have been restored. Nevertheless, it is true to say that the favourable outcome of conservation activity in the Basilica in Umbria did depend largely on the huge funds at their disposal and the static conditions of the immovable property – which made it possible to replace some parts of the paintings in situ. Furthermore, the work was not carried out in a warzone, of course, where any conservation activity must be under constant guard by army or police – to ensure the

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11 See Brandi 1946.
safety of the operators and the protection of the cultural property – and where it is pretty much impossible to collect and sort through rubble quickly. In practice the safeguarding of cultural property is almost always viewed as a subsidiary activity.

The difficulties of re-composing murals, then, vary according to the circumstances of collapse, the static situation of the building, the socio-political context and climatic and environmental conditions:

- **Circumstances.** Total or partial building failure may depend on different causes (a bomb blast within or nearby; ground vibration caused by bombs or missile warheads impacting close to the building; collapse of walls, frame or roof and/or ceilings weakened by blasts or bullets; high temperatures caused by fires; etc.) often in conjunction with other causes, which only rapid and targeted action could succeed in avoiding.

- **Static situation of the building.** As safety of the personnel must be a priority, before attempting any conservation activity on cultural property it is vital to check the state of the area and the static capacity of the immovable property to stand any external strain (e.g. light tremors, vibration from heavy vehicles, rainfall, snowfalls, etc.).

- **Socio-political context.** Preventive analysis of the socio-political context is crucial not only to guarantee the safety of the staff involved in protecting cultural property, but also to avoid any reprisals towards the property itself on the part of the warmongers.

- **Climatic conditions.** As a rule mural restoration takes place in the open air. It is thus essential to study the climate and seasonal averages in the area of interest so as to plan the most suitable operative strategy.

- **Environmental Conditions.** Thorough knowledge of environmental conditions in the area (e.g. presence of depleted uranium, of mines and/or unexploded ordnance, snipers, biological and/or chemical weapons, mass graves, etc.) is fundamental for any decision as to whether a project may go ahead and what, if any, means and/or tools should be adopted to reduce danger.

It is fairly obvious that any measures to be taken in an area contaminated by depleted uranium will be different from those required in mined or cluster-bombed areas or exposed to the risk of snipers or terrorists and that different procedures must be put in place according to the climate of the region in question – procedures whose successful outcome depends largely on the experience, practice and common sense of the personnel involved.

The phases of conservation regarding murals, mosaics and architectural decoration can be broken down into five: verifying the state of the area and restricting access to the property or site, recovery, safe housing, recomposition and restoration.
6.2.2. Verifying the state of the area and restricting access to the property or site

Any building which has come under fire from artillery, bombs or mines may house unexploded ordnance, bomb traps, depleted uranium dust or residues of chemical weapons. For this reason prior to taking any emergency action it is useful to ascertain the state of the area with the aid of the Bomb Disposal experts. At the same time, while waiting for restoration work to go ahead and to avoid the loss of precious information, theft and/or further damage to murals, mosaics and architectural decoration, access to the building or historical site must be restricted and kept under surveillance round the clock by police or soldiers of the occupying army (in the event of an invasion or peacekeeping operations).

6.2.3. Recovery of materials

The recovery phase is extremely delicate because it is on its success that any real possibility of the partial or complete recomposition of murals, mosaics or architectural elements depends.

To safeguard as much information as possible and enable a smooth recomposition of the fragments found, recovery should be carried out according to the basic principles of archaeological digs, which are based on topography and stratigraphy. Thus before going ahead a numbered grid should be put in place over the surface where fragments have fallen (fig. 19).

When rescue work is in operation and the rapid removal of rubble by mechanical means is required, an empty area should be chosen nearby to deposit the rubble itself, making sure that the rubble is placed so that it matches the original site at least to some degree and that the rubble does not get mixed (fig. 20).

Recovery must be carried out by direct observation of piles of debris – to pick up easily identified fragments quickly before they are damaged further or destroyed – and through sifting. In this latter case care should be taken to pick out the elements
to be separated starting from the outside of the pile and working from the top downwards with sieves and brushes, dusting off non-adhering particles to make sorting easier.

All recovered artefacts should be kept in containers, divided according to type and bearing the grid numbers assigned to the collection sector and stratigraphic unit (SU). It is best to keep containers open to allow the passage of air and to avoid condensation (e.g. wood or plastic chests) and that each container is marked by a sector reference number and SU.

Since ancient constructions could easily have been built upon pre-existing structures and may be filled with ceramics, glass, paper, etc., sifting of the debris must be carried out meticulously and if possible any bricks or building materials should be sorted and kept back for reconstructing the building itself.

During the course of work by the “Istituto Centrale del Restauro” on the frescoes which collapsed in the Basilica of Assisi following the earthquake of September 1997, it was possible to distinguish fragments by type. In addition, where a first re-composition of a painting was possible thanks to the finds of significant and easily recognisable parts of the representation (e.g. faces, hands, attributes, inscriptions), the fragments were placed in their own containers on a layer of sand - to bed down plaster fragments of different thickness. Nonetheless, it would be fair to say that the cultural and religious significance of the Basilica of Assisi, the international media coverage it came under – which made the collection of massive funds and consequent rapid conservation action possible – and the operational environment in which each phase of recovery and recomposition of the paintings was carried out are rather fortunate circumstances - to say the least - and somewhat unlikely during armed conflict or in the aftermath of war when emergency action to protect cultural property must be prompt, cheap and rapid.

20. When it is required the rapid removal of rubble by mechanical means, an empty area should be chosen nearby to deposit the rubble itself, making sure that the rubble is placed so that it matches the original site at least to some degree and that the rubble does not get mixed.

6.2.4. Safe housing of materials

In the unlikely event that the static condition of the building allows, it would be preferable to leave fallen materials *in situ*, protect with covering or improvised means (metal sheeting, plastic covering, etc.) and wait for the most favourable conditions in which to begin the various phases of conservation. It would also be a good idea to set up some temporary covering where rubble has to be moved elsewhere. In any case, it is vital to collect and keep water away from the area where the rubble lies and ensure good airing. In the absence of suitable areas for the safe housing and temporary shelter of mosaics, murals and/or architectural decoration, recovered on the field or from sifting through debris, it is crucial to set up awnings, canopies or tents, complete with shelving for the systematic storage of containers to save the material in. At emergency’s end and when circumstances permit, all fragments recovered should be moved to a permanent shelter, equipped with special areas for long-term storage and conservation where all the phases regarding the recomposition of murals, mosaics and architectural decoration may be carried out successfully.

6.2.5. Recomposition and restoration

The recomposition and restoration of paintings, mosaics and architectural decoration can rarely be carried out *in loco* and always requires lengthy periods of work, heavy funding and, in armed conflict scenarios, that the peace process is under way. Though this present work is devoted exclusively to activities regarding the prevention and emergency conservation of cultural property in warzones, this paragraph does mention two crucial phases in the conservation of murals, mosaics and architectural decoration: recomposition and restoration, which require the involvement of professional figures specialised in different fields (art history, architecture, restoration, information technology, photography and design). Before embarking on this venture it is vital to determine the static conditions of the building, to decide whether to put the restored work back in its original position and to calculate the exact area of the collapsed surface. Besides this, after taking photographic or digital records of the area, a search must be made for all photographic records (possibly colour) taken prior to the event that caused the collapse – to simplify recognition of each single fragment and, thus, their recomposition. The first phase of recomposition includes studying all available photographic records and selecting and cataloguing the recovered fragments according to content, material and colour. Next, digital film images of each fragment should be stored on
disks, making it possible to print in colour and/or to work out the original position of the fragment itself with specific software.

Initial assembly of the fragments whose origin can be ascertained should be carried out with a ‘recomposition plan’, made up of a board or any flat surface on which the photographic image of the painting or mosaic, at a scale of 1:1, may be placed and covered with an acetate sheet. The fragments identified should be placed on this photographic base and if the edges can be joined, partially glued.

An examination of the characteristics of each single fragment (profile, outline, etc.) can also be an aid to identify the elements which made up arches, ceilings, niches, etc.

An experimental computer project has recently been set up for the virtual recomposition of over 80,000 fragments regarding the Mantegna frescoes recovered after the heavy bombings of March 1944 with specific software capable of comparing and repositioning digital images of the fragments on a map represented by the reproduction of the only surviving records of the picture cycle dating back to the 1920s.13

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13 See AA.VV. 2003; Galeazzi, Toniolo 1994, 89-97.

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