Glossary of Terms Relating to Consolidants, Adhesives and Coatings from C.V.Horie, Materials for Conservation 2nd edn (2010 in press)

(comments welcome)

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TERM	DEFINITION	NOTE
adhere	Two surfaces adhere when they are held together by an adhesive.	Deprecated term: stick or glue
adherend	An adherend is a body which is held to another body by an adhesive.	Substrate is a broader term.
adhesion	Adhesion is the state in which two surfaces are held together by interfacial forces.	Adhesion acts between a substrate and a coating, adhesive or consolidant.
adhesive	An adhesive is a substance which holds two surfaces together by interfacial forces.	The adhesive in place should be distinguished from the liquid material which sets to form the adhesive.
adhesive failure	Adhesive failure is the rupture of the adhesive bond, such that the separation appears to occur at the adhesive/adherend interface.	
ageing	Ageing is the combination of the irreversible changes in the properties of a material which occur with the passage of time.	
artificial ageing	Artificial ageing is the exposure of a material to laboratory conditions in order to study the changes on ageing.	The environmental conditions are usually increased, in time or intensity, over that experienced by the material in normal use.
batch	A batch of a product is the result of a single making of a formulation.	It is expected that there will be little variation between samples taken from the same batch, with significantly more batch to batch variation.
binder	The binder in a liquid coating is the solid polymer component of the medium.	A liquid coating might be made up of pigments, dyes, a binder and solvents.
blocking	Blocking is the unwanted adhesion of two surfaces.	Blocking can occur in books whose pages have been reinforced using a consolidant with too low a glass transition temperature.
blooming	Blooming is the unwanted deposit on the surface of a film usually rising from within the film or by chemical reaction between the film and the environment.	For example, some oils contain waxes that separate and appear on the surface as the film sets.

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blushing	Blushing occurs as a milky opalescence within a film of lacquer.	Blushing can occur when a liquid coating absorbs water from the environment or object, causing the dissolved polymer to precipitate.
bond	To bond two adherends is to join them with an adhesive.	Deprecated term: glue.
bond line	The bond line is the layer of adhesive that attaches the two adherends.	
bond strength	The bond strength is the force needed to break an adhesive assembly with failure occurring near the plane of the bond line.	
casein adhesive	A casein adhesive is an aqueous dispersion of casein, compounded with other reactants especially alkalis.	
catalyst	A catalyst is a substance that changes the rate of a chemical reaction but is not changed by the reaction.	
chain polymerisation	Chain polymerisation is the growth of a polymer by successive reaction of a monomer with a reactive site on the growing chain, with a reactive site being regenerated.	This results commonly from a free radical, but also ionic, reaction.
chain scission	Chain scission is a chemical reaction resulting in the breaking of the main chain bonds.	
chalking	Chalking is the appearance of a loosely adherent powder on a film resulting from the degradation of the binder.	
coating	A coating is a continuous layer formed after application of a coating material to a substrate.	Narrower terms: varnish, lacquer, paint
coating material	A coating material is a product that, when applied to a substrate, forms a film with specific properties.	Most coating materials are liquids which form a liquid film, However, some materials are applied as vapours to form a solid film. Narrower terms: varnish, lacquer
cohesion	Cohesion is the state in which the particles of a substance are held together by primary or secondary valence forces.	
cohesive failure	Cohesive failure is the loss of cohesion within the body of a material.	Cohesive failure can take place in the adhesive, termed cohesive failure of the adhesive, or in the adherend, termed cohesive failure of the adherend.

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collagen	Collagen is the major fibrous protein making up bone and skin.	Degraded collagen is the major component of glue and gelatine.
consolidant	A consolidant is a solid material which changes the properties of a porous object by filling the pores or joining the particles.	A consolidant is usually used for strengthening, but can also change the optical properties or the hydrophobicity.
consolidant material	A consolidant material infiltrates a porous substrate then sets to form a consolidant.	
consolidation	Consolidation is a treatment designed to change a porous substrate by incorporating a consolidant.	
contact adhesive	A contact adhesive has the property of auto adhesion.	
copolymer	A copolymer is composed of more than one type of monomer	This term might be elaborated, like terpolymer (3 monomers). See polymer
creep	Creep is the time-dependent strain in an adhesive resulting from a sustained stress.	
cross-link	A cross-link is a part of the polymer molecule where at least 4 chains emanate.	The cross-link is usually formed by covalent bonds, but may result from weaker chemical interactions, such as hydrogen bonds. The result of many cross-links is a three dimensional network.
cure	When a liquid cures to form an solid material, it sets as a result of a chemical reaction.	
curing	Curing is the increase in molecular size by chemical reaction.	For example, linseed oil cures by polymerisation to form a solid film.
curing agent	A curing agent is an additive to a liquid material that promotes curing by taking part in the reaction.	For example, styrene forms cross-links during the curing of a polyester resin.
curing temperature	The curing temperature is the temperature to which the adhesive must be heated to cure the adhesive.	
curing time	The curing time is the time necessary during which an assembly is subjected to heat to cure the adhesive.	The time will vary with the temperature of cure which should be stated, e.g. room temperature, 40°C, etc.
deformation	A material is deformed when its shape has been changed.	The change of shape can be reversible or irreversible.

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degradation	Degradation occurs when a large molecule is broken into smaller molecules by chemical reactions.	For example, collagen is degraded in the process of forming gelatine.
delamination	Delamination is the separation of layers in a laminate because of the failure of the adhesive, either in the adhesive itself or at the interface of the adhesive and adherend.	
depolymerisation	Depolymerisation is the process of converting a polymer into a monomer.	Not to be confused with degradation. For instance, PMMA can be converted back to its monomer by heating.
dirt pick up	Dirt pick up is the tendency of a dry film to attract soiling material to its surface.	The soiling may be resting on the surface, and so be more or less removable, or be retained within the structure of the film.
dirt retention	Dirt retention is the tendency of a dry film to attract and hold soiling material on or in its surface.	
dispersion	A dispersion is a two phase system in which one phase is particles suspended in another phase.	Both the dispersed and continuous phases can be solids, liquids or gases (except one cannot have a gas/gas dispersion). Smoke, beaten egg whites, and dispersion adhesives are all dispersions.
distortion	A material suffers distortion when its shape has been changed more than it can recover elastically.	
dry	When a liquid dries to form an adhesive, consolidant or coating, it sets as a result of loss of solvent.	
drying time	The drying time is the period of time during which a liquid material on a substrate is allowed to dry.	This is often assessed by the loss of tack to a finger (or thumb).
elasticity, modulus of	The modulus of elasticity is the ratio of stress to strain when a material is deformed elastically.	Young's modulus applies to tensile forces. Compression, torsion strains etc also have elastic moduli.
elastomer	An elastomer is a polymer which returns rapidly to approximately its initial dimensions and shape after a substantial deformation by a weak stress and release of the stress at room temperature.	

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emulsion	An emulsion is a stable two phase system in which small droplets of one liquid (the internal phase) are dispersed in a second continuous liquid phase (the extended phase).	Deprecated: latex
failure	The failure of a joint occurs when the adherends separate totally or in part.	Failure can occur in the adherend, in the adhesive or at the interface.
fill	A fill is a replacement of a missing piece of an object.	
filler	A filler is a solid material used to modify the properties of an adhesive or gap-filler.	Fillers may be used to increase strength or weatherability, reduce weight etc.
film	A film is a layer of applied material.	A film could be the result of applying a liquid adhesive, a coating material or a liquid consolidant, from initial application to a final solid state. Film is used in other contexts to mean a thin flexible polymer sheet.
flash point	The flash point is the lowest temperature at which a product emits sufficient vapour to be ignited by a source of ignition.	A measured flash point depends on the condition of test.
flow	Flow is the movement of a liquid before it sets or gels.	
gap-filling adhesive	A gap-filling adhesive bridges the existing space between two adherends.	
gel	A gel is a polymer highly swollen with a liquid.	
gel point	The gel point is reached during the transition from liquid to solid when the film starts to exhibit elastic properties.	Gelation may occur because of cross-linking of the polymer or because the viscosity has risen so the film can no longer flow.
gelatine	Gelatine is a protein adhesive made from collagen broken down and extracted from parts of animals.	Glue is an impure form of gelatine.
glass transition	The glass transition is a reversible change in an amorphous polymer between a viscous rubbery condition and a hard brittle condition	This property can be measured by a number of different properties, such as optical and volumetric.

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glass transition temperature	The glass transition temperature is the approximate midpoint of the temperature range over which glass transition takes place.	The exact specification of the methodology and the point chosen makes a considerable difference to the value quoted, so needs to be explicit, e.g. {ASTM E1356-08, 2008 #6740}.
gloss	The gloss of a surface is its ability to reflect light specularly.	There is variation in glossiness, from matte through eggshell to mirror, whose value is determined by the method of test.
glue	Glue is a protein adhesive made from collagen broken down and extracted from parts of animals.	Gelatine is a purer form of glue.
gum	A gum is a water soluble or dispersible adhesive (frequently composed of polysaccharides) obtained from plants.	Examples are gum Arabic and dextrin.
hardener	A hardener is one component of a multi-pack product that takes part in a chemical reaction to form a solid material.	In a two pack epoxy adhesive, the hardener is usually an amine compound.
heat activated adhesive	A heat activated adhesive is a dry film that is made tacky by heat applied to the assembly.	For example, BEVA is heat activated above 68°C.
heat setting adhesive	A heat setting adhesive is one that sets on the application of heat.	For example, many epoxy resin mixtures may be kept cold to prevent the normal curing process that occurs at room temperature.
homopolymer	A homopolymer is a polymer made up of only one type of monomer.	see polymer
hot melt adhesive	A holt melt adhesive is rendered fluid by heating and forms the bond on cooling.	
hydrolysis	Hydrolysis is a degradation reaction resulting from reaction with water.	For example, starch can be hydrolysed to smaller molecules by extended storage in water.
hygroscopic	A hygroscopic material is capable of absorbing from and releasing water to the environment.	
interface	The interface is the area of contact between the adherend and adhesive.	
isinglass	Isinglass is a gelatine made from the swim bladders of fishes.	Sturgeon is the traditional source of isinglass.

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joint	The joint is the location at which two adherends are held together by an adhesive.	
laminate	A laminate is made by joining together two or more layers of material or materials.	
laminate	To laminate is to make an assembly by bonding layers of materials together.	
levelling	The levelling of a coating material is its ability to flow after application to minimise irregularities caused by the application process.	
liquid adhesive	A liquid adhesive is one that when applied to a substrate sets to form an adhesive.	
matting agent	A matting agent is an additive incorporated into a coating material to reduce the gloss of the dry coating.	synonym: flatting agent
medium	The medium is all constituents of the liquid phase of a coating material.	The medium will include dissolved polymer, solvents, dispersing agents etc.
melting point	The melting point of a polymer is the temperature at which both amorphous and crystalline components of a polymer have become liquid.	
molecular weight	The molecular weight is the weight of one mole of the molecules.	Abbreviation MW; Synonym: molecular mass Strictly, molecular mass is the mass of one molecule and the molar mass is the mass of N (Avogadro's number) x molecular mass.
monomer	A monomer is a low molecular weight compound which can react with 2 or more other monomers to form a polymer.	
monomer unit	A monomer unit is the repeating constituent of a polymer molecule.	Monomers change significantly when they react to form a polymer, so one should not confuse the properties of the original monomer with the structure of monomer units in the polymer.
natural	A natural polymer is one that has been prepared from animal or plant material with little or no chemical modification.	Few natural polymers are used without significant processing. Gum Arabic and mastic are examples.

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oligomer	An oligomer is a very low molecular weight polymer whose properties differ significantly depending on the degree of polymerization.	Ketone resins and PEG are examples.
open time	The open time is the period between applying the liquid to the adherends and the assembly of the joint.	The open time is usually the period until the viscosity of the liquid rises too high to allow it to flow and wet the surfaces. For example, a joint made with a hot glue solution has a limited open time before the glue gels.
paint	Paint is a pigmented coating material that forms an opaque coating.	
paste	A paste is semi-solid plastic gel.	In conservation, paste frequently refers to a mixture of starch and water.
peel	Peel is the force applied to a joint in which one or both of the adherends is flexible and in which the force is concentrated at a boundary line.	
penetration	Penetration occurs when the liquid material enters a substrate.	
plasticiser	A plasticiser is an unreacting additive to the liquid material which makes the resulting solid material more flexible.	
plasticity	Plasticity is the property which enables a material to retain its shape under a force not exceeding its yield value and to flow above this value.	
polycondensation	Polycondensation is the growth of a polymer by means of condensation reaction.	For example, a polyester is made by stepwise addition of monomers reacting with the elimination of water.
polymer	A polymer is a large molecule formed by the reaction of many smaller monomer molecules.	The term is also used collectively to describe material used.
polymer molecule	A polymer molecule is formed of multiple repeating units, monomers.	
polymerisation	Polymerisation is the process of converting monomers into a polymer.	

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pot life	The pot life is the time during which a multi-part adhesive can be used after mixing the components.	Synonym: working life
pre-polymer molecule	A pre-polymer molecule is a polymer or oligomer molecule that can enter into subsequent polymerisation.	Polyester and epoxy resins are made by reacting pre-polymers with cross-linking molecules, frequently also oligomers.
pressure sensitive adhesive	A pressure sensitive adhesive is a visco-elastic material, which in solvent-free form remains permanently tacky.	For example, the adhesive on a self adhesive tape.
primer	A primer is a coating applied to the substrate, prior to application of the liquid material, to improve the performance of the bond.	For example, a coupling agent can be applied to produce chemical bonding between the adherend and the adhesive.
release agent	A release agent is a coating intended to prevent or reduce adhesion.	Release agents are used when making or taking a mould.
resin	A resin is an amorphous polymer or oligomer.	Resin is increasingly used for low molecular mass materials, such as natural resins.
retrogradation	Retrogradation is the change of starch pastes from low to high viscosity on standing.	
sample	A sample is a portion of a material intended to be representative of the whole.	Samples may be taken for current or delayed analysis.
set	A liquid sets to form a solid, when it has developed its cohesive strength and other physical and chemical properties.	Setting may be by chemical (curing), physical (cooling) or evaporation (drying) means.
setting time	The setting time is the time needed for the liquid to form a solid.	
shear	Shear is the force applied to a joint that acts in the plane of the bond line.	
size	A size is a gelatine which has been applied to a surface to reduce penetration of a liquid or to increase adhesion.	Application of the gelatine solution is called sizing, and is used for paper, plaster etc.
slippage	Slippage occurs when the adherends move during the bonding process.	

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solvent	A solvent is a liquid that dissolves another material.	The term solvent is sometime (erroneously) used to mean a mobile liquid.
solvent activated adhesive	A solvent activated adhesive is a dry film that is rendered tacky just prior to use by the application of a solvent.	
solvent adhesive	A solvent adhesive has a volatile liquid as the vehicle.	
specimen	A specimen is a portion of a sample used in a test.	
storage life	The storage life is the time during which the liquid material will remain in useable condition, under specified circumstances.	Deprecated term: shelf life.
strain	Strain is the unit change due to force in the size of a body relative to its original size.	Strain can be measured in tension, compression, torsion etc
stress	Stress is the force exerted per unit area at a point within a plane.	
stress-strain diagram	A stress-strain diagram is one where stress and strain are plotted against one another.	
substrate	A substrate is a material to which a liquid material is applied.	A substrate can be the object to which an adhesive, coating or consolidant is bonded.
surface tension	Surface tension is the energy needed to increase the surface area of a liquid by a defined value.	
surfactant	A surfactant is a material added to a liquid to lower its surface tension.	Colloquial: wetting agent
synthetic	A synthetic polymer is one that has been prepared from monomers.	
tack	Tack is the property of a material that enables it to form a bond of measurable strength immediately on contact with another surface.	The tack of a film is related to its viscosity. Tack is commonly tested with a finger.
tensile force	A tensile force is applied by pulling along the line of the object being tested	
thermoplastic	A polymeric material is thermoplastic if it can be repeatedly softened by heating and hardened by cooling.	Not all un-cross-linked polymers are thermoplastics, e.g. cellulose.
thermosetting	A material is thermosetting if it is cured to a polymer by heating.	Many thermosetting polymers are now available that require heating only to room temperature.

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thixotropy	Thixotropy is the decrease of apparent viscosity under shear stress, followed by a gradual recovery when the stress is removed.	Pastes are thixotropic, i.e. they have very high viscosity or are solids at rest but can be made more liquid by stirring or brushing.
varnish	A varnish is a clear coating material.	
viscoelasticity	A material demonstrates viscoelasticity in response to a stress when it has both elastic and viscous behaviour.	Many coatings are solid elastic materials but can flow to absorb dirt.
viscosity	The viscosity of a liquid is its resistance to flow.	
water-borne	A water-borne adhesive is one where the volatile carrier of the adhesive material is water, either acting as a solvent or as a dispersing phase.	
wetting	The wetting of a substrate occurs when a liquid spreads over its surface.	
wetting agent	A wetting agent is an additive or pre-treatment used to improve the contact between a liquid and a solid.	A wetting agent can be used to help the dispersion of pigments in a medium, or the coverage of a liquid material over a substrate.