

ADHESIVES - Are There Hazards? By Sue O'Neill

Do we, as embroiderers and educators, need to reconsider the general use of adhesives as applied to our embroidered articles? Many products such as masking tape, fray check, hair tape, surgical tape, "Scotch" tape, glue, paste and fabric bonding materials may contain substances that can be potentially harmful to our embroidery fibers and grounds. Most of these products were not manufactured expressly for use on embroidery fibers. Many were developed only for a specific application. Most were not manufactured with conservation specifications and/or not necessarily meant for long term use. I think we need to consider four aspects of these substances before applying them to our needlework:

pH content
flexibility
reversibility
chemical stability.

☞pH Content

The pH scale is the scientific means of expressing the degree of acidity or alkalinity. The pH scale is represented by the numbers 0 - 14. pH 7 is neutral and the numbers below express acidity. The numbers above 7 express alkalinity. The scale is logarithmic; i.e. 8 is ten times more alkaline than 7, 9 is 100 times more alkaline than 7, 10 is 1000 - - 6 is ten times more acid than 7 and so on. Why is pH of a product important? Because many of the above mentioned products contain varying degrees of acidity or alkalinity. These acids or alkalis can cause premature oxidation of fibers if they are not chemically in balance with the particular fiber, fiber dye or fabric finish.

Cotton and linen fibers are particularly susceptible to direct contact with most acids. According to *Textile Fabrics and Their Selection*, even dilute acids can weaken cellulose fibers and prolonged contact will destroy them. Many previously mentioned products contain acids. These acids are capable of migrating from one area to another using the fibers as a straw. This means that masking tapes applied to the edges of our fabrics could contain acids that might affect the middle of the embroidered areas. I am often asked; "How long does it take?" Duration could be immediate, hours, months or years depending on environmental conditions and the particular type of adhesive.

There are adhesive products on the market for use by conservationists that are acid-free and pH neutral. It should be noted that most acid-free products are actually alkaline substances. Most acid-free products range from 8 to

9 on the pH scale. In one of my catalogues the Pritt Glue Stick is said to have a pH of 10. Is that too alkaline for our embroidery fibers? Wool and silk are both vulnerable to dilute amounts of alkalies. According to one article I have, wool begins to dissolve at the relatively mild pH of 8. Knowledge of chemical compatibility with a particular fiber is essential to our art form.

☞Flexibility

Our natural fibers expand and contract with environmental changes in temperature and humidity. Wool and silk can absorb 30% of their respective weights in a moisture saturated atmosphere, cotton 21%, and linen 13%. In areas where atmospheric conditions vary from season to season, our embroidery fibers are constantly swelling and shrinking. Many adhesives are synthetic and do not absorb as much moisture as our natural fibers. Adhesives can restrict natural movement and therefore sap the tensile strength of fibers. Also, they can harden with age. The hard edges, over a period of time, can actually cut textile fibers.

☞Reversibility

Basically, there are three types of adhesives: those that are water soluble; those that can be removed with soaps, detergents or chemical solvents; and those that are permanent. One of the "Golden Rules" of textile conservation is to make all finishing techniques and substances reversible. Once masking tape is applied, no amount of soap or detergent can remove the adhesive. Strong solvents can do irreparable damage to our fragile textile fibers. Some of our embroideries can never be wet cleaned so adhesive residues from many products, including hair tape and Fray Check, are there forever. I have both seen and read about embroidered pieces where iron-on tapes were applied to hold textile splits together. Those tapes had actually been responsible for further splits and abetted the chemical degradation of the very fibers they were to hold in place. Many adhesives and bonding agents, such as Stitch Witchery, are permanently embedded in the fibers and can never be removed.

I am currently looking into natural adhesives such as wheat paste and rice paste. According to *Traditional Japanese Embroidery*, the Japanese use wheat paste on the back of their silk work. However, I have been told that if it is not used correctly, it may cause mold and mildew as well as attract bugs. Also, I suggest we question the use of

Rabbit Skin Glue as it applies to our various embroidery fibers. At one time rabbit skin glue was made from animal proteins. This glue has been known to attract insects. (The direct application of insect sprays can be another source of textile damage.) Currently, some rabbit skin glues may contain chemical synthetics and these substances are more than likely to become a permanent part of your embroidery. More investigation needs to be done with regard to natural water soluble adhesives.

☞ Chemical Stability

Some adhesives are comprised of synthetic substances which could be chemically unstable over long periods of time. They could break down with age and give off harmful gases, become toxic and/or produce chemical reactions not compatible with our fibers, dyes and finishes. Individual environments (temperature, humidity, and pollution) may contribute to the chemical instability of many man-made products. Even natural substances oxidize with age and in the case of cellulose products, can actually turn into a type of sugar before they disintegrate. This sugar can be a source of food for rodents and insects.

Conclusion

Personally, I believe that most adhesive substances are hazardous to our fragile needlework fibers. Natural water soluble adhesives such as wheat and rice paste are probably the most safe for use on our natural fibers. Wheat paste appears to be more compatible with protein fibers and rice paste with cellulose fibers. Their one drawback is the fact that they can oxidize into a form of sugar and therefore attract bugs. Some recipes call for boiling wheat or rice flour. Some call for using actual wheat or rice starch. The Japanese mix a small amount of wheat powder in the palm of their hands, working it into a paste that is close to external body temperatures before direct application to their embroidery. Does their technique help prevent premature oxidation, mold and mildew? More investigation needs to be done with regard to natural, water soluble adhesives. Therefore, I must decide how I feel about my work and what personal intentions I have for a particular piece before applying such substances. Is my piece a craft object or an heirloom? Before getting out that roll of tape or bottle of glue, I ask myself the following questions: Do I know what is in this adhesive substance? Do I know if it is compatible with my embroidery fibers and grounds? Can I wash my work to remove this substance or is it going to be a permanent and potentially harmful part of my work? Will future generations be able to deal with this substance and its long-term affects on my needlework? Do I really need to apply this adhesive to my fibers or would a different technique or stitch do just as well? Stitches are reversible. I truly believe we must consider these questions before we

advocate the use of adhesive products as part of an embroidery education.

Bibliography - Adhesives

- Bellinger/Loveman - "Basic Habits of Textile Fibers" *EGA Newsletter*. Constellation Chapter (1960?).
- Brown, June - *Needlepointers*, Oct./Nov. 1985, Ecclesiastical Needlepoint, "Finishing Before You Start".
- Bulbach, Stanley - *Threads Magazine*, June/July 1986, "Why Bother with Natural Dyeing?".
- Butterfield/Stack - *The Weavers Journal*, Spring 1985, "An Ounce of Prevention".
- Cole, Susan - *Preservation Guide #1, Family Papers*, Historic New Orleans Collection, 1983.
- Davis, Mary Kay - *The Needlework Doctor*, Prentice Hall, 1982, "Preventive Medicine".
- Frederickson, Mary - *Just Cross Stitch*, May/June 1986, "Caring for your New Textiles".
- Giffen, Jane C. - Technical Leaflet #2, The American Association For State and Local History, History News, December 1970, "Care of Textiles and Costumes".
- Heinicke, Joyce - *Needlepoint News*, Nov-Dec. 1982, "Common Sense Needlepoint Conservation".
- Horowitz, Estelle - *Textile Preservation*, Needlework Treasures, 1981.
- Hottelet, Ann - *Needle Arts*, Winter 1982, "Textile Conservator Basics".
- Johnson, Arthur - *The Practical Guide to Craft Bookbinding*, Thame and Hudson, 1985.
- Lawrence, John - *Preservation Guide #2, Photographs*, The Historic New Orleans Collection, 1983.
- Malland, Harold F. - *Considerations for the Care of Textiles and Costumes*, Indianapolis Museum of Art, 1980.
- Nisley-Leader, Sandra - *The San Francisco Chronicle*, "Tips for Preserving Family Documents".
- Saito, Iwao - *Traditional Japanese Embroidery*, Introduction.
- Thomse, Fonda Ghiardi - *Preprints*, The American Institute for Conservation of Historic and Artistic Works, June 1978, "Re-evaluation of A Modern Treatment for A Historic Textile".
- Watson, Pat - *Americana*, Volume #11, Number 4, Sept/Oct 1983 "How to Hang Fabrics Safely".
- Wingate/Mohler - *Textile Fabrics and Their Selection*, Prentice Hall, 1984 Edition, "Cotton and The Consumer", "Linen and the Consumer", "Wool and the Consumer", "Silk and The Consumer".
- University Products, *Archival Quality Materials* 1987/1988.
- Smithsonian Institution, *The National Museum of American History*, "Preparation and Framing A Flat Antique Textile for Exhibition, 8/80.

