

Core Concepts in Disaster Preparedness, Response, and Recovery for Inkjet-printed Photographs and Fine Art – Daniel Burge, Image Permanence Institute, Rochester Institute of Technology, Rochester NY USA

INTRODUCTION

Large numbers of inkjet prints are already in collections (Burge et al, 2009). Unfortunately, many are considerably more sensitive to water damage than traditional prints, and some may even harm adjacent materials during water emergencies. Existing research has shown that inkjet prints immersed in water are prone to bleed, cracking, delamination, blocking, etc. (Burge et al, 2012). Each form of damage is highly dependent on the inks used as well as the chemical and physical nature of the papers. Research at the Image Permanence Institute (IPI) over the last three years on the effects of water exposure and techniques for recovery has led to the following core concepts for the salvage of inkjet prints during water emergencies.

CONCEPT ONE: Inkjet is not a homogenous group of materials that exhibit similar responses to water exposure

Many inkjet prints are immediately and severely damaged on contact with water; however, others can last days with only minor cockling. This is because, over the last three decades, the colorants, coatings, and papers used in inkjet printing have constantly evolved. As a result a recovery prioritization table can be made for inkjet prints (see Table 1).



TABLE 1

The following table can be used to determine which inkjet prints are most vulnerable and should be recovered first, which may be initially resistant but will slowly deteriorate, and which can remain in water until the final salvage efforts can be made. Warning labels, such as color coded dots, placed on shelves, boxes, and other enclosures can guide responders directly to the objects that should be saved first.

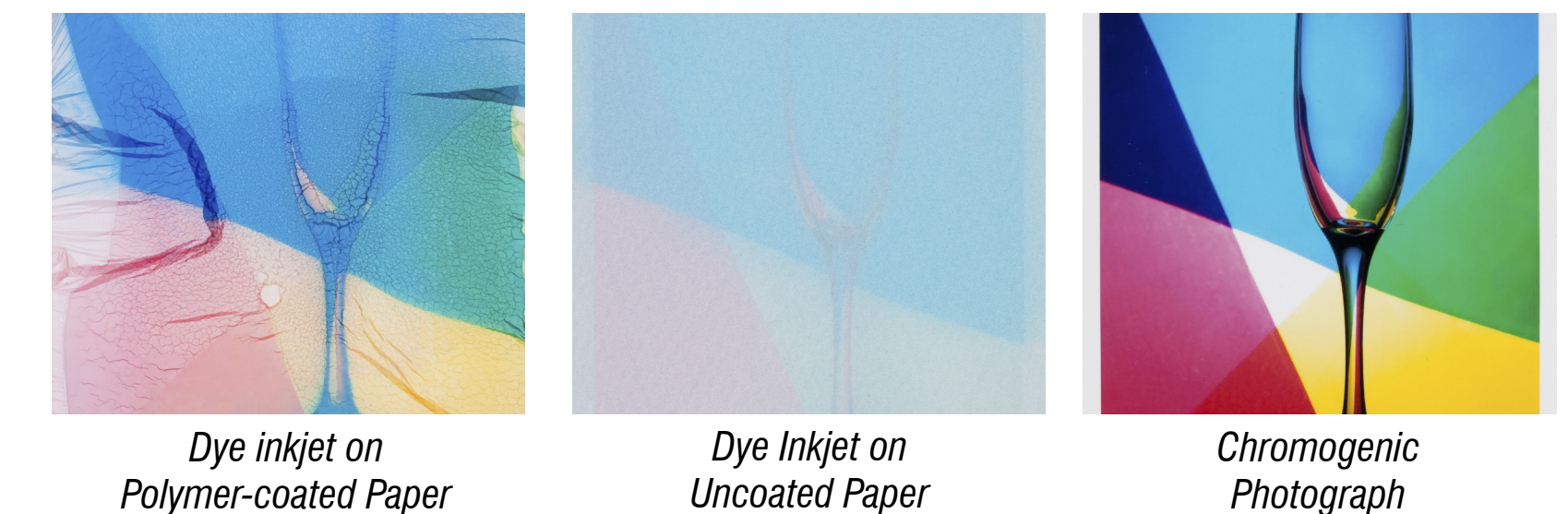
Highly Vulnerable	Vulnerable	Retrieve Last
<ul style="list-style-type: none"> Dye on uncoated fine art paper Dye on porous-coated fine art paper Dye on polymer-coated RC paper Dye on porous-coated baryta paper 	<ul style="list-style-type: none"> Dye on porous-coated RC paper Pigment on porous-coated RC paper Pigment on porous-coated fine art paper Pigment on porous-coated baryta paper 	<ul style="list-style-type: none"> Pigment on uncoated fine art paper

● Highest Risk
 ● Moderate Risk
 ● Lowest Risk

CONCEPT TWO: While inkjet prints often look like photographs, they do not behave in any way like traditional photographs when exposed to water

The rule of thumb that photographs can remain submerged for up to 48 hours does not apply to inkjet because inkjet damage begins and continually increases from first water contact onward. Traditional photos are resistant to water because they were specifically designed for prolonged immersion in liquid processing chemicals. The sooner inkjet prints are removed from water and dried, the better the chance for recovery.

Prints after 48 hours water immersion



CONCEPT THREE: Inkjet prints should be accurately cataloged and stored out of harms way in plastic sleeves and boxes where possible

Preparation involves good record keeping, thoughtful storage, and proper enclosures. To start, staff must accurately record print types within cataloging systems using consistent meaningful media names.



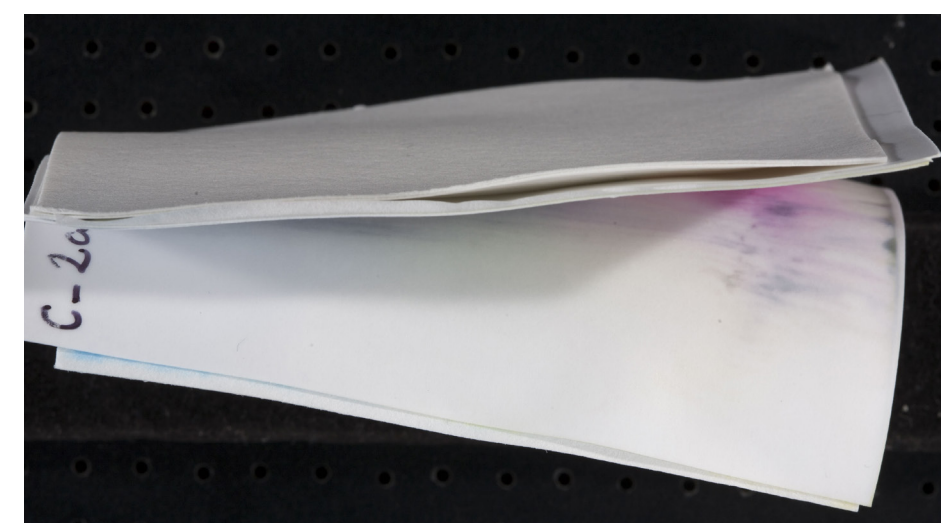
Inkjet prints in polyester sleeves in an archival box

Prints should be stored in areas with low risk of water contact such as high shelves and upper floors. Housing in plastic sleeves and sturdy boxes, can buy precious time over loose or paper-housed prints.

Warning labels on boxes with especially sensitive objects can provide guidance to those dealing with the chaos of an actual emergency, guiding them to materials that need the most rapid response (see Table 1).

CONCEPT FOUR: Inkjet prints should be removed from water as quickly as possible, separated from enclosures, and then air-dried individually and horizontally

Prints exposed to dirty or salt water should be rinsed to remove particles of debris and reduce salt content. Extended rinsing during recovery will not improve outcomes and may worsen damage. Prints must be immediately separated from stacks and removed from enclosures to prevent bonding or continued colorant bleed. They should never be dried stacked, either directly or interleaved, but individually and horizontally. Most individual prints will air dry within 48 hours but artist books may take much longer. Freezing drying can minimize wet time, and prevent further damage, though more research is needed to establish its safety (Jürgens 2010).



Prints should be separated before drying to prevent continued bleed or permanent bonding



Prints should be gently rinsed to remove dirt particles before drying

CONCEPT FIVE: Beware of high humidity in the flooded areas and locations where prints may be laid out to dry

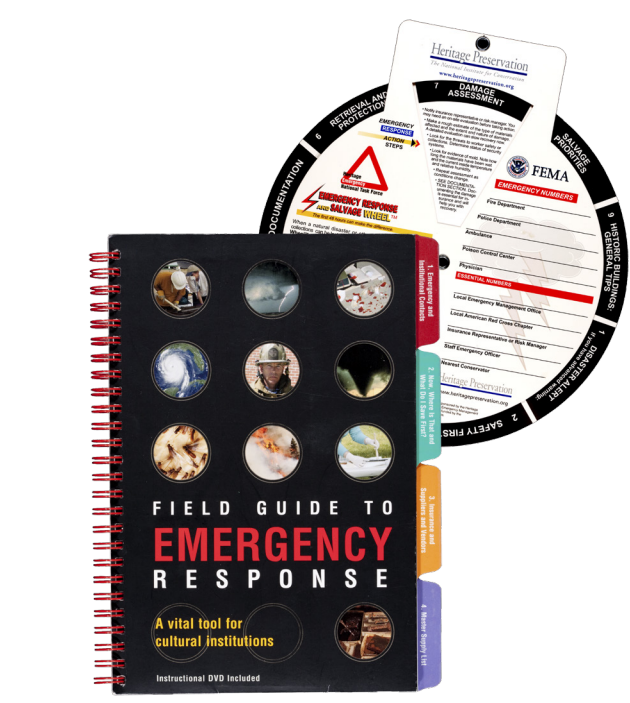
During an emergency, focus will likely be on items that are wet or submerged, but dry items above the water line will be exposed to high relative humidity (RH) which can also cause damage. The humidity of areas used for drying should also be monitored to avoid high RH inducing further ink bleed, blocking, or mold (Salesin 2014, Rima 2009). Lower humidity speeds drying, while higher humidity extends dry time. Any salvage attempts that prolong print wet time will increase the likelihood of damage.



Humidity-induced bleed results in loss of detail, image sharpness, and color fringing

CONCLUSIONS

Inkjet is a diverse group of materials with dramatic variations in water sensitivities. Damage can be instantaneous or occur slowly over days. Proper education and training followed by thoughtful preparations and response rehearsal will be the most effective strategies to surviving water emergencies for these collections. Of course, water emergency response should not focus solely on inkjet but the entire range of collection materials as well as human health and safety. For these reasons a full disaster plan should already be in place.



Emergency Response Guide and Wheel



Digital Print Preservation Workshop

REFERENCES

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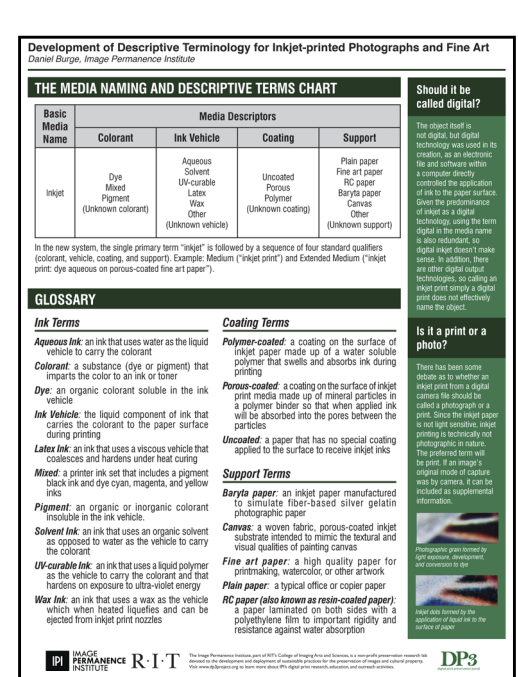


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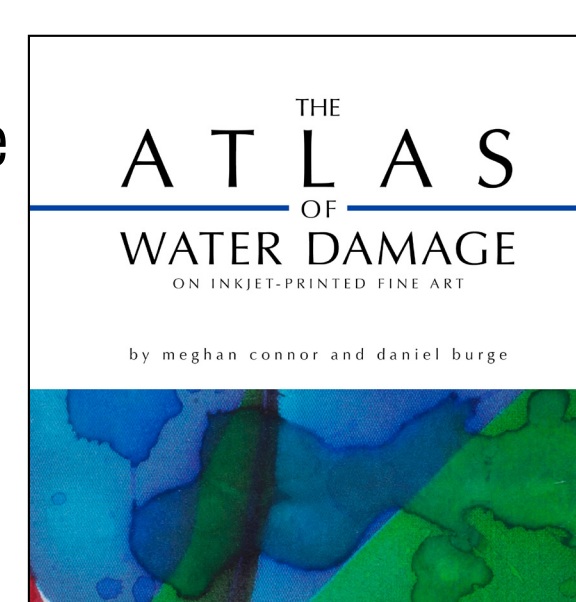
A New Language: Inkjet Naming Conventions

IPI has developed a new naming convention and set of descriptors for inkjet-printed photographs and fine art prints to ensure accurate object understanding and care. In this new system, the single primary term "inkjet" is followed by four useful qualifiers (colorant, vehicle, ink receiver, and support) that can provide a complete picture of the material and be used as a reliable guide to communicate about and care for the object. This guide is available for download at www.dp3project.org.



The Atlas of Water Damage on Inkjet-printed Fine Art

This new book from IPI will help potential water emergency responders become aware of the various ways that inkjet prints can be harmed during water emergencies. Each page highlights a unique form of damage. Every water emergency will be different, so prior familiarization with all potential types of damage will help disaster responders understand what has occurred to their objects as well as how best to react to and recover their materials during the actual event.



<http://www.imagepermanenceinstitute.org/atlaswaterdamage>

DP3 Project Website Update

A brand new Inkjet Water Emergency section of the DP3 Project website will help staff:

- prepare collections before an adverse event to mitigate or minimize damage
- evaluate what has occurred during a water emergency and make the right decisions during recovery
- manage the recovery and drying process to get objects stabilized and safe from further harm

