

Contents



Preface	xiii	Choosing X-ray equipment and facilities	25
Acknowledgements	xv	Practical approaches to textile radiography	30
Contributors	xvii	Determining correct exposure parameters	35
Part 1: Textile X-radiography	1	Thin homogeneous textiles	39
1. Introduction	3	Layered and more complex textile objects	39
<i>Sonia O'Connor and Mary M. Brooks</i>		Thicker textiles	40
The catalyst for this book	3	Heterogeneous textiles	40
The history of textile radiography	5	Mixed-media objects	41
Radiography at the Textile Conservation Centre	7	X-raying 'special needs' textiles	43
Imaging textiles using mammography	8	Special radiographic techniques	50
Developing practice	10	Notes	56
Notes	10	References	56
References	11	4. Textile X-radiography and digital imaging	58
2. Principles of X-radiography	12	<i>Sonia O'Connor and Jason Maher</i>	
<i>Sonia O'Connor</i>		Introduction	58
Introduction	12	Digital versus analogue	58
X-rays and the electromagnetic spectrum	12	Components of a digital image	59
Properties of X-rays	13	Storage of digital images	62
Production of X-rays	13	Digital image capture	64
Conventional radiography	15	Direct and computed radiography	67
Optimising image quality	16	CR and textile radiography	68
Viewing film radiographs	21	Digital image processing	69
Working with film radiographs	21	Summary	71
Storage and archive of radiographic films	22	Notes	73
Summary	22	References	73
Note	22	5. Image interpretation	74
References	22	<i>Sonia O'Connor</i>	
3. High definition X-radiography of textiles: methods and approaches	23	Introduction	74
<i>Sonia O'Connor</i>		Negative images	74
Introduction	23	Interpretation basics	76
Why textiles seem difficult to X-ray	23	Characteristic images	78
Low energy high definition radiography	24	Effect of exposure on image interpretation	81
		Image artefacts	88
		References	90

6. Assessing the risks of X-radiography to textiles	91	Notes	149
<i>Sonia O'Connor, with a contribution on DNA by Jason Maher</i>		References	149
Introduction	91		
Colour	91		
Dating	91		
DNA	92		
Organic textile fibres and dyes	92		
X-ray analysis	93		
Testing radiographed silk samples	94		
Summary	94		
Notes	94		
References	94		
7. Radiation safety	96		
<i>Graham Hart</i>			
Introduction	96		
Myths and legends	96		
Justification, optimisation and limitation	96		
United Kingdom <i>Ionising Radiations Regulations</i>	97		
Radiation and risk	97		
Putting risk in perspective	100		
Practical radiation protection	100		
Radiation monitoring	101		
Conclusion	103		
Acronyms	103		
References	103		
Part 2: Exploring the X-radiographic features of textile objects	105		
<i>Sonia O'Connor and Mary M. Brooks</i>			
8. Materials	107		
Fibres	107		
Fillings	109		
Supports, stays and substructures	119		
Miscellaneous materials	123		
Note	125		
References	125		
9. Threads, fabrics and construction techniques	126		
Yarns and threads	126		
Cords and plaits	126		
Woven textile structures	126		
Non-woven structures	136		
Construction techniques	140		
Other construction methods and materials	145		
10. Surface decoration	150		
Painted and printed textiles	150		
Underdrawing	153		
Appliqué and embroidery	153		
Metal threads	154		
Unusual materials used for surface decoration	156		
Note	159		
References	159		
11. Makers and making, degradation and repair	163		
Makers and making	163		
Degradation	164		
Use and wear	166		
Reuse, repair and conservation	168		
Summary	171		
Notes	171		
References	172		
Part 3: Case studies	173		
Introduction			
<i>Mary M. Brooks and Sonia O'Connor</i>			
12. Evaluating X-radiography as a tool for examining upholstered furniture	175		
<i>Kathryn Gill</i>			
Introduction	175		
Practical challenges to the radiography of historic upholstered seat furniture	175		
Radiography for documentation: case study of an eighteenth century upholstered chair	176		
Radiography as a complement to photographic evidence: case study of the Seehof Suite	176		
Interpretation of the X-ray images	178		
What is not revealed by radiography: case study of the Audley End settee	180		
Investigation of a portable medical facility for object examination	182		
Conclusion	183		
Acknowledgements	183		
Notes	183		
Acronyms	184		
References	184		

13. The use of X-radiography in the Textile Conservation Laboratory, Opificio delle Pietre Dure, Florence: methodological, technical and research approaches towards a non-invasive investigative technique	185	Acronyms	210
<i>Susanna Conti and Alfredo Aldrovandi</i>		References	210
Introduction: concepts and issues	185	15. Hidden Structures: the use of X-radiography in the Fashion Gallery at Snibston Discovery Park, Leicestershire	212
Selecting appropriate analytical approaches	186	<i>Clare Bowyer</i>	
Radiography applied to textiles: technical issues	186	Introduction	212
Radiography of large textiles	186	The Fashion Gallery, Snibston Discovery Park	212
The use of radiography at the <i>Opificio delle Pietre Dure</i>	187	<i>Hidden Structures</i>	212
Pilot study of the use of radiography in textile conservation: case study of a chasuble	188	Selecting objects for radiographic display images	213
Case study: a Chinese screen	190	Chosen objects and radiographs	214
Case study: a fifteenth century velvet fragment from a nineteenth century collection	193	Feedback and evaluation	216
Case study: a mitre	194	16. X-radiography of a knitted silk stocking with metal thread embroidery	217
Case study: dressed statue	196	<i>Sonia O'Connor, Mary M. Brooks and Josie Sheppard</i>	
Case study: wax sculpture <i>Dormitio Virgini</i> ("The Death of the Virgin")	199	Introduction	217
Discussion	201	The stocking	217
Acknowledgements	201	Condition	218
Notes	201	Radiography	219
References	201	What the radiography revealed	221
14. The role of X-radiography in the documentation and investigation of an eighteenth century multi-layered stomacher	203	Summary	224
<i>Gabriella Barbieri</i>		Acknowledgement	224
Introduction	203	Note	224
The Nether Wallop cache	203	Reference	224
The practice of concealment: a contextual framework	203	17. A chalice veil rediscovered	225
The stomacher	204	<i>Sonia O'Connor and Mary M. Brooks</i>	
Rationale for research	205	Introduction	225
General aims of project	206	Description	225
Specific objectives of X-ray examination	206	Condition	226
Methodology	206	Evidence from radiography	226
Interpretation of the radiographic images	206	Conclusion	230
Materials and construction	207	Acknowledgement	230
Patterns of use	208	Notes	230
Patterns of degradation	209	References	230
Conclusion	209	18. The use of X-radiography in the analysis and conservation documentation of a set of seventeenth century hanging wall pockets	231
Acknowledgements	210	<i>Mary M. Brooks and Sonia O'Connor</i>	
Notes	210	Introduction	231
		The hanging wall pockets	231

Materials and construction	231	Taking and interpreting radiographic images	268
Condition before treatment	231	Stuffings, squeakers and structures	268
Radiography	231	Construction and assembly methods	269
Information obtained from the radiography	233	Threads and fabrics	272
Embroidery techniques	235	Conclusion	272
Damage and repair	235	Acknowledgements	272
Conclusion	236	Notes	272
Acknowledgements	236	References	272
Note	236		
Reference	236		
19. 'In needle works there doth great knowledge rest': the contribution of X-radiography to the understanding of seventeenth century English embroideries from the Ashmolean Museum of Art and Archaeology, Oxford	237	22. X-radiography of patchwork and quilts	273
<i>Mary M. Brooks and Sonia O'Connor</i>		<i>Mary M. Brooks, Sonia O'Connor and Josie Sheppard</i>	
Introduction	237	Introduction	273
Radiography techniques	237	Quilting and patchwork: a brief overview	274
The contribution of radiography to understanding materials, condition and construction	238	The value of radiography for curation and conservation	274
Summary	247	Special requirements for radiography of quilts and coverlets	275
Acknowledgements	247	Information from radiography	275
Notes	247	Benefits of radiography	284
References	247	Acknowledgements	287
		Note	287
		References	287
20. X-radiography of dolls and toys	249	23. Revealing the layers: The X-radiography of eighteenth century shoes at Hampshire County Council Museums and Archives Service	288
<i>Mary M. Brooks, Sonia O'Connor and Josie Sheppard</i>		<i>Sarah Howard and Robert Holmes</i>	
Introduction	249	Introduction	288
Materials and manufacture of European dolls: a brief overview	249	Radiography at HCCMAS	288
The value of radiography for curation and conservation	256	Films and processing	289
Summary of radiography methods	258	Selection of shoes for radiography	289
Information from radiography	261	Construction of heels	289
Summary	265	Stitching	290
Acknowledgements	265	General construction	293
Notes	265	Conclusion	293
References	265	Notes	293
		References	293
21. X-radiography of teddy bears and other textile artefacts at the Victoria & Albert Museum	266	24. The contribution of X-radiography to the conservation and study of textile/leather composite archaeological footwear recovered from the Norwegian Arctic	294
<i>Marion Kite</i>		<i>Elizabeth E. Peacock</i>	
Introduction	266	Introduction	294
Early radiography of textiles and dolls at the Victoria & Albert Museum	266	History of Russian Pomor hunting activities on Svalbard	294
Radiography of teddy bears	266		

The burial environment on West Spitsbergen, Svalbard	295	The Horniman Museum musette	314
The Russekeila site	296	Treatment proposal and the role of radiography	315
The artefacts and their recovery	296	Radiographic procedures	315
The footwear recovered at Russekeila	296	Interpreting the radiographs	316
Radiography of the footwear	296	Impact of radiography on the treatment and interpretation of the musette	318
Results and implications	298	Acknowledgements	318
Conservation strategy and implementation	299	Notes	318
Russian Pomor textile/leather composite archaeological footwear revisited	299	References	318
Conclusion	300	28. X-radiographic examination of a historic mannequin on display in Edinburgh Castle, Scotland	319
Notes	301	<i>David Starley and Fiona Cahill</i>	
References	301	Introduction	319
25. Controlled lifting and X-radiography of gold threads from ancient archaeological textiles	302	History of the mannequins	319
<i>Elizabeth Barham</i>		Description	320
Introduction	302	Background to the projects	320
The Spitalfields Roman sarcophagus textile finds	302	Purposes of radiography	320
The Prittlewell Anglo-Saxon chamber-grave textile finds	304	Radiographic procedure and equipment	320
Conclusions	306	Interpretation of the radiographs	322
Acknowledgements	306	Evidence for dating	323
Notes	306	Summary	323
Reference	306	Acknowledgements	324
		Note	324
		References	324
26. X-radiography of ethnographic objects at the Horniman Museum	307	29. X-radiography of Rembrandt's paintings on canvas	325
<i>Louise Bacon</i>		<i>Ernst van de Wetering</i>	
Introduction	307	<i>Précis by Mary M. Brooks and Sonia O'Connor</i>	
Radiography equipment and methods used at the Horniman Museum	307	Editors' note	325
Textile elements in ethnographic artefacts	308	Rembrandt's oil paintings on canvas	325
The conservation benefits of radiography for ethnographic artefacts with textile components: two case studies	308	Objectives of research into canvas supports	325
The ethics of radiography	311	Radiographs as a means of studying canvas	325
Conclusion	311	Research methods and results	326
Acknowledgements	312	Characteristics of canvases by, or attributed to, Rembrandt	327
Notes	312	Conclusion	327
References	312	Acknowledgements	327
		References	328
27. The use of X-radiography in the conservation treatment and reinterpretation of an incomplete musette	314	Index	329
<i>Sylvie François</i>			
Introduction	314		
Musette	314		