

**Proceedings of the  
Fifth International Conference on**

**FLOW PROCESSES IN  
COMPOSITE MATERIALS**

**(FPCM-5)**

**Robbins Centre, University of Plymouth  
12-14 July 1999**

Advanced Composites Manufacturing Centre  
Department of Mechanical and Marine Engineering  
Plymouth UK

**ISBN 1-870918-01-0.**

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Published by:

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First published, July 1999. © ACMC Plymouth.

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Cover design realised by Dave Tomkinson.  
Printed by Media Services, University of Plymouth.

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**The Fifth International Conference on  
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**Welcome FPCM-5 and to Plymouth**

The University of Plymouth and the International Technical Committee are honoured and pleased to welcome you to the Fifth International Conference on Flow Processes in Composite Materials. This conference is the fifth in the FPCM series of international meetings devoted to manufacturing of polymer matrix composites. Each conference has attracted high quality papers and provided a forum for discussion amongst academics and industrialists. The previous meetings were held at:

Brunel University	1988
selected papers published in Composites, January 1989, 20(1).	
University of Limerick	1991
selected papers published in Composites Manufacturing, 1991, 2(3/4).	
University College Galway	1994
selected papers published in Composites Manufacturing, 1995, 6(3/4).	
University College of Wales, Aberystwyth	1996
selected papers published in Composites Part A, 1998, 29(1/2).	

It is anticipated that selected papers from this conference will be refereed for publication in a special issue of Composites Part A: Applied Science and Manufacturing.

The organising committee is indebted to those contributors who have helped make this such a useful technical document. Our sincere thanks go to Elsevier Science for their promotion of this event and their continued interest in publishing refereed papers from the FPCM series as special issues of their journals. Thanks are also due to the Faculty of Technology Short Course Unit for the co-ordination of arrangements for the meeting, including this volume.

We hope that you will enjoy this volume and appreciate the excellent work of our many authors, whether you are a conference delegate or a later reader of these proceedings.

John Summerscales  
Chairman of the Organising Committee  
July 1999.

Plymouth is an attractive city situated on Plymouth Sound which is one of the largest natural bays on the South Coast of England. The city has a long history with especial interest during the reign of Queen Elizabeth I when Drake and other notable sea captains sailed from the city. It was also a point of departure for the Mayflower sailing to America with the early settlers. The Dartmoor National Park lies immediately to the north of the city and the spectacular coastline of Cornwall to the West. Major tourist attractions in the city include the National Marine Aquarium, boat trips to the dockyard and warships and Plymouth Dome. Recent architectural awards have been won by the Western Morning News building (Nick Grimshaw and Partners, 1992) and Sainsbury's Marsh Mills supermarket.