



SME Affiliate Scheme

Affordable access to NCC capabilities, training and networks

Technology Breakfast Briefings

Consortia Building Events

NCC Software / Equipment
Training

Hot Desking

Open Access Training Courses

Digital Logo Partnership

Membership announcement
press release

Quarterly Newsletter

Network with 50+ NCC members

SME Affiliate members benefit from 12 months of opportunities across the NCC – all for £2,500 per year.



Up to three places on selected NCC training courses*

Introduction to
Composites: Webinar

Introduction to Composite
Materials: Theory &
Practical

Introduction to Composite
Mould Tool Production

Introduction to Resin
Infusion Techniques

Introduction to Manual
Prepreg Techniques

Intermediate Manual
Prepreg Techniques

Appreciation of
Non-Destructive Testing for
Composites

Composite Design
Principles:
Part 1

Composite Design
Principles:
Part 2

*Subject to availability at time of booking



Unlimited access to bi-monthly NCC topic-specific breakfast briefings and funding call consortia building events*

Breakfast briefings

Network with other NCC members over teas, coffees and pastries whilst hearing the latest developments and funding opportunities in composite materials and process technologies from the NCC and our academics and industrial partners.

Consortia building events

Join us for a briefing on a live CR&D funding call, and have the opportunity to discuss the subject with other interested companies and join a consortia.

*Subject to availability at time of booking



Training on one piece of NCC software or equipment

NCC Equipment

DMA / TGA
Microscope
CIJECT 2 HT
Small ovens package
Granulator
Laser Projection System
Portable Measuring Arms

NCC Equipment

Resin Injection
Tailored Fibre Placement
Vacuum Former
Ultrasonic Welder
Continuous Fibre 3D Printer
Polymer 3D Printer

NCC Software

CoDA
ESAComp
LAP
TexGen



Bookable hot desks in the NCC Connect office*

35 days of desk rental
to use throughout the year
in the NCC Connect office
at the NCC, Bristol

Access on-the-doorstep
advice from the
NCC Connect Rapid
Response team

Build networks and share
knowledge and experience
with NCC staff and
other members

*Subject to availability at time of booking



Expand your company's visibility through exposure on the NCC's communications channels

Press release announcing your **Membership** on the NCC website and social media channels

Your company logo displayed on the NCC website and TV screens around the NCC

Opportunity to be featured in the **NCC Members quarterly newsletter**





Connect@nccuk.com

www.nccuk.com

[@NCCUKinfo](#)



Training Course Information



Introduction to Composites (Webinar)

Many people in the composites industry, don't work with composites on a day-to-day basis. Whether you're working with suppliers, colleagues or customers, knowledge of the topic is still important.

This course is aimed at those who want to improve their basic understanding, to interact more effectively with the wider industry.

During this course, we'll introduce you to the materials, their properties and how they're made.

We recommend this course for individuals or groups who are new to composites.

What we'll cover:

- ✓ Defining the term 'Composite'
- ✓ The properties of fibres and resins
- ✓ Different types of resin system and reinforcements
- ✓ Room and elevated temperature resin systems
- ✓ Identifying and comparing weave styles
- ✓ The benefits of composites to build components
- ✓ Types of manufacturing processes
- ✓ Fibre orientation
- ✓ Core materials



1-20 people



Introduction



Individual Price: £100

Closed Course (up to 20): £1,600



3 Hours



Webinar



Training@nccuk.com

www.nccuk.com



Introduction to Composites (Theory and Practical)

If you're entering the world of composites and want to improve your core knowledge, this course will give you a better understanding of the fundamentals.

This is a foundational level course where we'll introduce you to the basics of composites, their composition and how they're manufactured. You'll reinforce your knowledge as you get hands-on with some materials and make your own part.

We recommend this course for individuals or groups who are new to composites.

What we'll cover:

- ✓ Defining the term 'Composite'
- ✓ The properties of fibres and resins
- ✓ Different types of resin system and reinforcements
- ✓ Room and elevated temperature resin systems
- ✓ Identifying and comparing weave styles
- ✓ The benefits of composites to build components
- ✓ Types of manufacturing processes
- ✓ Fibre orientation
- ✓ Core materials



1-10 people



Introduction



Individual Price: £300

Closed Course (up to 20): £2,400



1 Day



Theory and Practical



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Introduction to Manual Prepreg Techniques

With the control it allows operators and its breadth of application, it's no wonder manufacturing with Prepreg is so popular. Poor technique however can cause potentially serious and expensive errors.

During this course we'll give you the background into how to optimise your use of Prepreg materials, to achieve the best possible outcomes. We'll also show you the techniques used by Technicians and you'll have the opportunity to practice what you've learnt, as you produce your own hand-laid part.

Whether you're moving into Prepreg manufacturing or work in an environment where it's used and want to broaden your understanding, we recommend this course as an essential introduction to materials, process and application

What we'll cover:

- ✓ Understanding the theory behind Prepreg
- ✓ Understanding the manual layup process
- ✓ Related health and safety processes
- ✓ Practical layup of a shaped section and a sandwich flat panel:
 - Prepreg Laminating
 - Vacuum Bagging/Debulking
 - Cure cycles
 - Fabric draping



1-8 people



Introduction



Individual Price: £600

Closed Course (up to 20): £3,840



2 Days



Theory and Practical



Training@nccuk.com

www.nccuk.com



Introduction to Resin Infusion Techniques

Resin infusion is popular for those wanting better quality parts compared to wet lay-up, at a cheaper cost than Prepreg. Without proper training however, both product quality and your own safety could be at risk.

The knowledge you'll gain from this course will help you avoid the common mistakes and produce better parts safely. You'll reinforce your learning over the 2 days as you complete your own infused parts, supported by our expert trainers.

A good understanding of the essentials of resin infusion will improve your results and help you to explore the wide range of material combinations and performance variable that resin infusion can offer

We recommend this course for Technicians new to composites manufacture



1-8 people



Introduction



Individual Price: £600

Closed Course (up to 8): £3,840



2 Days



Theory and Practical



Training@nccuk.com

www.nccuk.com

What we'll cover:

- ✓ Review of materials & processes
- ✓ Vacuum bagging procedures for Resin infusion
- ✓ Handling & cutting dry fabrics
- ✓ Practical Vacuum bagging
- ✓ Completing linear resin infusion
- ✓ Handling and cutting dry fabrics
- ✓ Completing a radial resin infusion
- ✓ Group practical assessment



Introduction to Composite Mould Tooling

A quality Mould Tool is a crucial element to your manufacturing process. With the costs involved in commercial production though, many choose to make their own.

This is a highly practical course, which will show you cost-effective ways of producing your own moulding from scratch. You'll gain the knowledge you need to produce quality parts and learn how to avoid common errors.

Whether you're working from original parts or creating a mould tool from nothing, we recommend this course as part of your essential introduction to composites manufacturing.

What we'll cover:

- ✓ Health & Safety around repair activity
- ✓ The purpose of the mould tool.
- ✓ Plug, patterns and mould tools
- ✓ Materials used in mould tool production
- ✓ Issues to avoid when designing a tool
- ✓ Types of release agents
- ✓ Problems occurring around poor release
- ✓ CSM mould tool production using wet lay-up techniques
- ✓ Producing original plugs using foam
- ✓ Sealing a plug to gain an acceptable surface finish



1-8 people



Introduction



Individual Price: £800

Closed Course (up to 20): £5,120



2 Days



Theory and Exercises



Training@nccuk.com

www.nccuk.com



Appreciation of Non Destructive Testing (NDT) for Composites

Everyone wants to produce cheaper, lighter and stronger composite parts. NDT has traditionally been seen as an obstacle to this, rather than an aid. This doesn't have to be the case.

This course is designed to demystify NDT for Non-NDT Engineers. You'll learn how you can leverage your understanding of NDT to drive real manufacturing benefits, better products and save NDT-related time and costs.

Led by an NCC NDT expert, we'll build your knowledge through classroom training, exercises, demonstrations and extensive practical sessions to what NDT really is and why you need to know about it.

We'll recommend this course for engineers at all levels who want to understand how NDT can be a benefit rather than a burden.



1-6 people



Introduction



Individual Price: £800

Closed Course (up to 20): £3,840



2 Days



Theory, Practical & Exercise



Training@nccuk.com

www.nccuk.com

What we'll cover:

- ✓ What is NDT, and why do we do it?
- ✓ What are defects and what do they look like?
- ✓ Applications in industry
- ✓ NDT methods for composites (Ultrasonic, Thermography, Shearography, Bond-testing) – including practical exercises
- ✓ Completing the picture - other NDT methods
- ✓ Understanding what NDT can tell us
- ✓ Benefits of NDT



Intermediate Manual Prepreg Techniques

If you're already producing Prepreg parts or you're close to the process and you want to enhance your skills and practical knowledge, this is the course for you.

We'll take you through 2 days of interactive, hands-on learning, where you will deepen your understanding of how Prepreg materials work and how to manipulate them to get the best possible results. We'll cover many of the advanced techniques use by technicians at the performance end of Prepreg manufacture.

This course is highly recommended for individuals and teams who want to improve their process and the quality of their finished parts. .



1-8 people



2 Days



Introduction



Theory and Practical



Individual Price: £800

Closed Course (up to 20): £5,120



Training@nccuk.com

www.nccuk.com

What we'll cover:

- ✓ Selecting Prepreg formats
- ✓ Technical terms relating to Prepreg materials and manufacture
- ✓ Completing a component from manufacturing drawings and instructions
- ✓ Identifying different techniques and when to use them
- ✓ Creating vacuum bags for autoclave cures
- ✓ Identifying faults and their causes
- ✓ Following quality control documents
- ✓ Using manufacturing data sheets to assist autoclave cures



Composite Design Principles

Part 1

The growth of composites in manufacturing is an increasing issue for Design teams. With all the variables around composite materials and processes, it can be daunting for engineers used to metals.

Whether you're adapting to changes in your supply chain or wishing to become more competitive, this course aims to demystify the approach to designing for composites. We'll cover the link between design, manufacturing and materials and the most important factors you'll need to consider.

We recommend this course for design engineering teams and individuals who want to develop their knowledge in composite design principles.

What we'll cover:

- ✓ Understanding the requirements for composite design and manufacture
- ✓ Key material considerations including:
 - Types of resin
 - Types of reinforcement
 - Selection criteria
- ✓ Awareness of key manufacturing process considerations such as:
 - Scale
 - Rate
 - Cost



1-10 people



2 Days



Introduction



Theory and Exercises



Individual Price: £800

Closed Course (up to 20): £6,400



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www.nccuk.com



Composite Design Principles

Part 2

Building on from Composite Design Principles Part 1, this course enables Design Engineers to start practically applying their knowledge to example case-studies.

During this course we'll demonstrate the link between design, manufacturing and materials. You'll begin to consider more complex techniques and issues surrounding composites design.

We recommend this course for engineering teams and delegates who want to continue to develop their knowledge in composite design principles

What we'll cover:

- ✓ Buckling in composite plates, beams and pressure vessels
- ✓ Design guidelines to maximise stability in laminates
- ✓ Basic materials models
- ✓ Material testing and model calibration
- ✓ Composite modelling in commercial FE packages
- ✓ Calculating critical buckling loads for composite panels
- ✓ Optimal fibre angle for pressure vessels
- ✓ Preliminary sizing for pressure vessels



1-10 people



2 Days



Introduction



Theory and Exercises



Individual Price: £800

Closed Course (up to 20): £6,400



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www.nccuk.com



Equipment

| | | | | |
|---|-----------------------------------|--|--|------------------------|
| DMA / TGA (Trained on both) | DMA - Dynamic Mechanical Analyser | Determines Storage Modulus, Loss Modulus, Damping, Creep, Stress Relaxation, Glass Transition, Softening Point | Sample type: Cured & Uncured materials | |
| | TGA - Thermogravimetric Analyser | Determines change in properties over time | Sample size – 10-15 mg | |
| Small ovens package (Trained on all three) | 5 - Carbolite PF450 | Working Dimensions: 1.2 x 0.6 x 0.5 m | Max Temp 249°C | Max Shelf Weight 10 kg |
| | 6 - Carbolite PF200 | Working Dimensions: 0.5 x 0.7 | Max Temp: | Max Shelf Weight |
| | 7 - Carbolite PF450 | Working Dimensions: 1.2 x 0.6 x 0.51 m | Max Temp: 250°C | Max Shelf Weight 10 kg |



| Equipment | | | |
|--|--|--|------------------------|
| Portable Measuring Arms (All count as separate equipment) | 1 – Romer 7-axis measurement | Measurement range – 3.5 m | Accuracy - 101 μ m |
| | 2 – Nikon 7-axis measurement | Measurement range – 3.5 m | Accuracy - 76 μ m |
| | 3 - 7-axis measurement | Measurement range – 4.5 m | Accuracy - 110 μ m |
| Resin Injectors 1, 2, 4, or 10 (All count as separate equipment) | 1 – ISOJET, 1 Pot, 6 bar, 120 Deg C | Resin Type: Polyester, vinyl ester, epoxy | |
| | 2 - ISOJET 2 - 3 Pot, 6 bar, 120 Deg C | Resin Type: Polyester, vinyl ester, epoxy | |
| | 4 - CIJECT 6X - 2 Pot, 20 bar, 150 Deg C | Resin Type: Polyester, vinyl ester, epoxy, BMI | |
| | 10 - CIJECT 3 V2 | Resin Type: Polyester, vinyl ester, epoxy | |



| Equipment | | | | | |
|------------------------------------|--|---|---|-------------------------|--|
| Microscope - Zeiss Axio Imager A2M | Objectives: 50x 20x 10x 5x 2.5x | Determines Void Content, Size of defects, lay-up errors | Used on polished, cured samples | | |
| Continuous Fibre 3D Printer | Build Volume: 320 x 132 x 154 mm | | Materials: nylon and carbon filled nylon | | |
| Polymer 3D Printer | Build Volume: 290 x 290 x 610 mm | | Materials: PLA, ABS, PC, PET-G, TPU, HIPS, Nylon and more | | |
| CIJECT 2 HT | 100°C, 30 bar | | <table border="1"> <tr> <td>Max resin weight: 25 kg</td> <td>Resin type: Epoxy, polyester, vinylester, hardener, in mould release agent</td> </tr> </table> | Max resin weight: 25 kg | Resin type: Epoxy, polyester, vinylester, hardener, in mould release agent |
| Max resin weight: 25 kg | Resin type: Epoxy, polyester, vinylester, hardener, in mould release agent | | | | |



| Equipment | | | | |
|--------------------------|---|---|---|-------------------|
| Granulator | GSC300/600 Granulator | | | |
| Laser Projection Systems | Projects, scans, and verifies locations on assemblies as well as detecting fibre orientation | | | |
| Ultrasonic Welder | Cylinder size - 1.5, 2.0, 2.5, 3.0, 3.25 | Frequency: 15, 20, 30, 40 kHz | Weld modes: Time, Peak Power, Ground Detect | Ultrasonic Welder |
| Vacuum Former | Sheet size: 1372 x 660 mm | Max material thickness: 6 mm | | |
| Tailored Fibre Placement | A tow of fibres is continuously sewn to a base material, enabling highly specific fibre position and orientation. | Materials: carbon, glass, aramids, and other fibres | Tailored Fibre Placement | |



| Software | Description |
|----------|--|
| CoDA | <p>The Component Design Analysis (CoDA) modules were developed to provide preliminary design procedures to enable a first analysis to be undertaken. For those with techniques such as finite element analysis (FEA), the initial CoDA analysis will enable potential materials, beam and plate sizes and thicknesses, and support conditions to be selected for further detailed investigation.</p> |
| ESAComp | <p>ESAComp has a vast set of analysis capabilities for solid/sandwich laminates and for micromechanical analyses. It further includes analysis tools for structural elements: flat and curved panels, stiffened panels, beams and columns, cylinders, bonded and mechanical joints.</p> |
| LAP | <p>Typically, the software is used in preliminary design for tailoring a stacking sequence, then analyzing the composite component with other methods such as finite elements, and finally optimizing the design by inspecting the laminate behavior layer by layer.</p> |
| TexGen | <p>TexGen is a geometric textile modelling software package to be used for obtaining engineering properties of woven textiles and textile composites</p> |

