

UK COMPOSITES 2013

**A Study into the Status, Opportunities and
Direction for the UK Composites Industry**

**Composites Leadership Forum
June 2013**



Department
for Business
Innovation & Skills

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The information contained in this Executive Summary is a synopsis of a study produced to meet the needs of the Composites Leadership Forum. This updates and expands previously produced information about the UK Composites Industry and the opportunities available across a range of industry sectors:

1. Aerospace
2. Automotive
3. Construction
4. Marine
5. Oil & Gas
6. Rail
7. Renewables

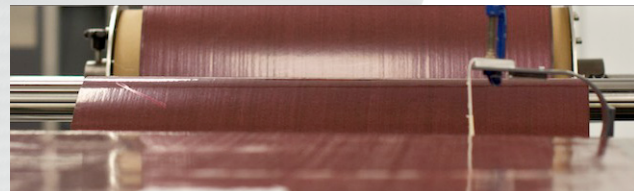
Proposals are made for actions to help ensure that the UK retains its global competitiveness.

BIS Industrial Strategy

The Business Secretary, Vince Cable, set out the Government's approach to industrial strategy in September 2012. Building on the Plan for Growth, Government set out how it would develop an industrial strategy focusing on business and Government working in partnership to establish an approach to support investment and growth.

Eleven industry sectors have been identified, covering aerospace, automotive, construction, energy (nuclear, oil & gas, offshore wind), education, professional and business services, information economy, life sciences and agri-tech sectors. The advanced manufacturing sectors, in particular, will be impacted by developments in composites materials.

It is recognised that such sectors invest in technology over a long timescale, consequently demanding a constant flow of new knowledge, skilled engineers and scientists. In line with this insight, several cross-cutting areas have been identified where government action, in partnership with business, can have a real impact and these include: technologies; access to finance; skills; and government procurement. Finally, as a part of its work on the 8 Great Technologies of the future, Government will continue to invest in Advanced Materials.



UK Composites Industry

The UK has been a major player in the development of both composites materials and their application across many industry sectors since the 1930s. The 2009 UK Composites Strategy was launched to support the industry in rapidly evolving and increasingly competitive markets where demands for reduced carbon emissions and increased performance were driving innovation and increasing the adoption of these materials.

Work undertaken as a result of the Strategy has increased capability and awareness through leadership, skills and supply chain initiatives, and is delivering increased manufacturing capacity through establishment of the National Composites Centre, the i-Composites CR&D project, the Composites Skills Alliance and the EPSRC's CIMComp Centre. The 2010 UK Composites Supply Chain report estimated there were 1,500 companies in the UK composites sector producing added value of around £1.1 billion.

Composites Leadership Forum

The CLF is working to influence the Government and other bodies (including industry, research centres, academia, skills providers) to bring together support for composites and ensure growth and industrial success for the UK.

Driven from the 2009 Strategy for UK Composites, the CLF was set up in mid-2012 from an industry initiative to coordinate and connect the activities of the growing number of composites-using companies, supportive stakeholders and industry organisations.

Fully supported by BIS, the CLF is chaired by industry with members drawn from industry sector groups (e.g. RenewableUK, Automotive Council), Government and stakeholders (e.g. TSB, EPSRC) and delivery partners (e.g. NCC, Composites UK).

The CLF represents the interests of both current and emerging composites-using sectors.

Government & Stakeholders

BIS
TSB
EPSRC
Materials KTN

- ▶ Technology and innovation
- ▶ Enable supply chains
- ▶ Build skills and learning
- ▶ Develop standards and regulations
- ▶ Ensure sustainability

Delivery Partners

NCC
Composites UK
Composites Skills Alliance
EPSRC CIMComp

Industry Sector Groups

Aerospace Growth Partnership
Automotive Council
Motorsport Industries Association
Construction
Renewables UK
Marine Industries Alliance
Railway Industry Association
Materials Suppliers
People - ESG

UK Composites 2013 Study

Status, opportunities and direction

This Study was funded by BIS on behalf of the Composites Leadership Forum (CLF) and published in June 2013. It comprised research and interviews with government and sector bodies combined with the acquisition of underpinning industry data.

The full version of the document, along with an associated database, now forms the initial live set of information owned by the CLF. This will be updated and expanded upon with assistance from sector representatives and other stakeholder partners and will be used to support supply chain development as well as inform an updated UK Composites Strategy.

Full Study report

The full document provides information on: industry sectors in which composites are or could be used; the UK composites supply chain; international support for composites development, actions and full recommendations.

See back page for contact details.

Composites defined for the CLF Study

Polymer matrix composites (PMCs) are also known as fibre reinforced polymers (FRPs) and consist of a matrix material, which is a polymer-based resin, surrounding and supporting a reinforcement of some kind (typically fibres, particles or flakes). The properties of the resultant PMC are advantageous compared to those of either the matrix or the reinforcement when used on their own.



Industry Background and Support

UK composites background

- The UK's leading position in composites development slipped during the 1990's.
- UK Composites Strategy, launched in 2009, reflected the UK's growing status at the forefront of composites development.
- This strategy focused on the development of manufacturing capability and capacity, with recognition that leadership, supply chain, skills, and environmental technologies development play a supporting role.
- Composites Leadership Forum (CLF) formed mid-2012.

R&D facilities

- A network of regional composites centres was established as a result of regional funding policy.
- An open-access, £25m National Composites Centre (NCC) was announced in 2009 strategy and opened in 2011. Now operating either through a pay-as-you-go or membership model, coordinating composites work with the regional centres.
- The NCC continues to grow. It joined HVM Catapult in 2011 and announced a £28m expansion plan in late 2012.

Research programmes

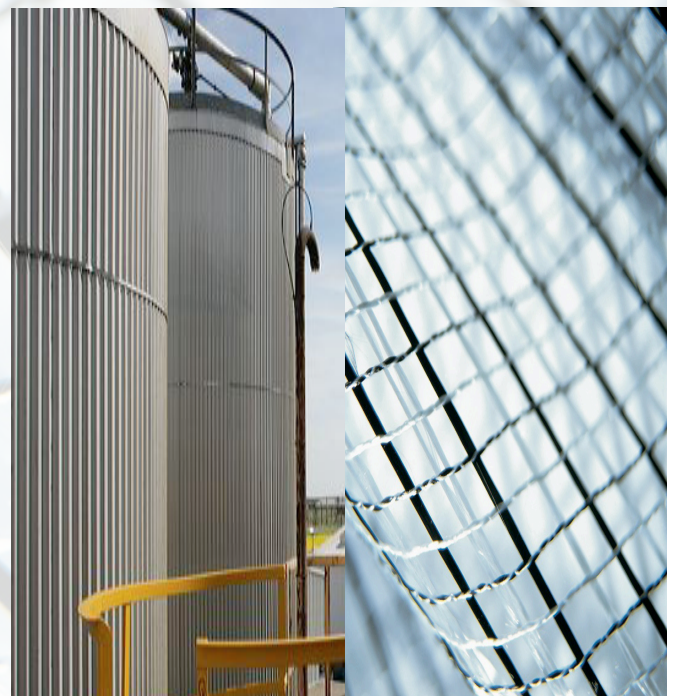
- Industrial composites research projects have been successful in winning funding from EPSRC, TSB, DSTL and EU.
- Significant TRL 4-6 projects have totalled some £300m over the last 5 years.
- Materials, AA&D and other KTNs currently identify sectoral needs for collaborative composites research development.
- CIMComp is a £10m EPSRC funded initiative involving the universities of Nottingham, Bristol, Cranfield and Manchester to undertake underpinning composites research at TRL 1-3.
- Strategic development of UK composites technology through engagement with all other industry sector roadmaps would increase identification of technology transfer opportunity and prevent duplication of effort.
- There is still a need for work on the sustainability of composites outlined in the 2009 Strategy.

Supply chain development

- The 2010 Supply Chain report indicated a need for the internal dissemination of information about the composites industry and to promote opportunities.
- The Composites Innovation Cluster is a £22m AMSCI project which aims to address issues within the UK composites supply chain, including development of a database to allow mapping and analysis of the supply chain.

Skills development

- The need for a wide range of materials and manufacturing technologies has led to a sector focused composites skills landscape with fragmented and reactive delivery by a limited number of training providers.
- The Composites Skills Alliance has started to develop a wider network of vocational providers as well as standard training products, ranging from awareness to basic design theory.
- Composites engineering apprenticeships are now available.
- Taught content in Higher Education has been limited and variable, opportunities are now in hand to develop exemplar curriculum for wide take-up in qualifications and CPD.
- Forecasting skills demand must take into account technology changes some years in advance of industrial need to ensure that the industry has an appropriately skilled future workforce.



Composites Supply Chain Headlines

Resin and fibres

- The UK has very limited glass and carbon fibre production, but has good representation from resin suppliers.
- In order to improve competitiveness, the UK needs to link fundamental materials R&D into the supply chain to optimise manufacturing process development.

Semi-finished materials

- The UK has good representation from manufacturers of prepreg, textiles and compounders and is world-leading in several areas.
- Knowledge transfer of rapid processing techniques from compounders to component manufacturers to facilitate high volume manufacturing for automotive applications.

Components

- The majority of this group are relatively small composites moulders that have been hit by the economic climate and competition from low cost economies and are seeking to diversify into new sectors and products.
- A small number of big players own a large percentage of value.
- There is significant interest from overseas companies in acquisition of UK composites manufacturing know-how.

Structures

- The UK has a strong position in the design and manufacture of aerospace composite structures but this is under threat from competition. Continued investment is required to maintain this status.
- The capability needs to be extended to other industry sectors beyond current areas of strength.

Enablers

- This category covers products or know-how that facilitate manufacture of composites components, e.g. suppliers of manufacturing, testing or automation equipment, software, design capability and tooling.
- UK capability needs to be mapped to identify gaps in automation equipment and design and simulation software provision.

Supply chain definition and data

- UK composites industry database has been established, and will be used and maintained by Composites Hub members: NCC, Composites UK and the Composites Skills Alliance.

Composites Supply Chain Gaps and Barriers

Recycling and environmental

Capability and know-how development was suggested in the 2009 UK Composites Strategy but has not been taken forward. Strategic development could help develop products to seize opportunities in sectors including automotive and construction.

Materials supply chain innovation

Fundamental materials research takes place in the UK but there is no strategic programme and few indigenous suppliers to help deliver new products or processes to take advantage of market opportunities. Other countries are recognising the opportunities in fundamental composite materials R&D, the UK needs to follow their lead.

Enablers

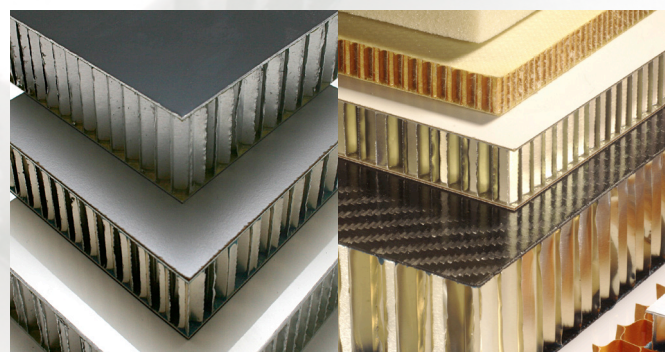
Changes in the way composites parts are being both designed and produced is creating a need for development of the enabling part of the UK supply chain. Many of these enablers will provide cost or performance differentiators in the global marketplace.

Guidelines, standards and regulations

The lack of appropriate guidelines and standards has been a barrier to the use of composites in sectors such as construction, rail and oil and gas.

Skills

Lessons learnt from the recent expansion of the composites aero structures market indicate that if the predicted expansion occurs across other sectors, such as automotive and wind, the UK will face significant composites skills shortages at all levels. The composites supply chain is also suffering from the general shortage of engineering skills.



Sector Activity and Composites				
	Aerospace	Automotive	Renewables	Cons
Global Headlines	<p>Value \$4,471bn; passenger aircraft to double in 20 years; CAGR 4.7% to 2030.</p> <p>MRO market £70bn.</p> <p>UAV defence dominated but predicted growth will include civil applications.</p>	<p>2012 sales \$80.4m; exceed \$100mn by 2017; top 10 manufacturers = 70%</p> <p>Drivers and trends: globalisation; recovery from recession; alliances to share development costs; environment and legislation.</p>	<p>1,360GW in 2011; 25% of global power generating capacity; 118 countries have renewable energy targets.</p> <p>Wind: 238GW; CAGR 26%.</p> <p>Trend: increase turbine size</p> <p>Tidal & Wave: doubled in 2011 to 527MW, mainly demonstrators, UK leading.</p>	<p>\$7.5tn market; workforce; 40%</p> <p>Residential 40% 28% and infras</p> <p>By 2020, emer increase 110% 35%.</p> <p>Drivers: costs</p>
Global Composites in Sector	<p>\$8.3bn in 2011; CAGR 9.7%; mainly CFRP.</p> <p>Driver: weight reduction to meet rising oil costs & emission targets.</p> <p>Technology transfer from military applications to civil aviation and UAVs.</p> <p>Opportunities: NGSAs, aero engines, new MRO regimes.</p> <p>Need to increase manufacturing rate; reduce cost & tolerances; integrate functionality.</p>	<p>Transportation market \$2.8bn in ; CAGR 6.5% 2012-2017.</p> <p>Driver: lightweighting to reduce emissions.</p> <p>Current: CFRP structural use in niche, low volume parts, GFRP non-structural use in high volume parts.</p> <p>Trend: growth in use of GFRP and potential use of CFRP in high volume parts, but not yet proven.</p> <p>Need to reduce production cost and time.</p>	<p>Wind: \$6bn in 2011; CAGR 8.6%, used in blades and nacelles; GFRP to date; increased size driving move to high tech manufacturing and some use of CFRP.</p> <p>Tidal & Wave: harsh environment requires excellent mechanical properties and corrosion resistance, technology immature, some demonstrators using composites but little market value yet.</p>	<p>Largest market by value; \$8.8B 4.7%.</p> <p>Composites used in building com increasing in st infrastructure.</p> <p>Advantages: h to weight ratio, low maintenance of installation a complex shape</p>
UK Sector Headlines	<p>17% of global market; 2nd largest aerospace industry globally; 75% exported.</p> <p>Major strengths: wing technology & aero engines.</p> <p>Technical & cost competition from developing markets.</p> <p>Government support continuing through AGP.</p>	<p>The UK produces 1.5m vehicles; 2.5m engines annually; £50bn market 2011.</p> <p>7 volume car manufacturers all overseas owned; supply chain 2,350 companies.</p> <p>Automotive Council developing competitive UK automotive strategy.</p>	<p>UK 2020 15% energy from renewables commitment.</p> <p>Offshore Wind: plans for 18GW by 2020 but unsure UK content.</p> <p>Onshore Wind: currently 5GW, 13GW by 2020.</p> <p>Tidal & Wave: UK world-leading, 20% of UK electricity by 2020.</p>	<p>£100bn turnover companies, ma employing 2 m</p> <p>Residential 39% 45% and nfrast</p> <p>Accounts for 5% emissions.</p> <p>Drivers: cost e & low carbon.</p>
UK Composites in Sector	<p>World-leading capability & market share under threat from developed and developing world, therefore must continue to innovate.</p> <p>Supply chain gap is aerospace grade carbon fibre, trend is overseas acquisition for rapid capability gain.</p> <p>Current growth leading to significant skills shortages.</p>	<p>World leaders in motorsport applications, historically limited but developing capability in volume applications.</p> <p>Composite technology development included in Automotive Council strategy.</p> <p>Need: recycling strategy to reduce part cost to competitive level.</p> <p>Ensure carbon fibre supply will meet demand.</p>	<p>Offshore Wind: R&D on blades, but uncertainty on future UK manufacture and opportunities for supply chain, strategic clarity is now urgent.</p> <p>Onshore Wind: growth providing supply chain opportunities for moulders.</p> <p>Tidal & Wind: opportunity in composites demonstrator parts.</p>	<p>Building Com through increas but high volum market.</p> <p>Building Struc take up, but de carbon solution</p> <p>Infrastructure experience and opportunities. E standards & inc</p>
Challenges	<p>International competition.</p> <p>Carbon fibre supply & R&D.</p> <p>Skills shortages.</p> <p>'Fight back' from metallic solutions.</p>	<p>Technology and cost base for volume manufacture.</p> <p>Supply chain need composite training.</p> <p>Carbon fibre supply.</p>	<p>Unknown offshore blade manufacturing demand.</p> <p>Successful tidal & wave devices still emerging.</p> <p>Potential skills shortages.</p>	<p>Appropriate sta</p> <p>Supply chain k skills.</p> <p>High initial cost</p>

Construction	Marine	Oil and Gas	Rail
<p>7% world energy.</p> <p>%, non-residential structure 32%.</p> <p>growing markets, developed world</p> <p>& codes.</p>	<p>Ships: 95% Far East build; driven by first cost and fuel use; 7% growth, \$300bn</p> <p>Naval: little growth, \$30bn, increasing sophistication of systems and performance.</p> <p>Leisure craft sales much reduced due to economic downturn, emerging markets growing.</p>	<p>2011 value \$3.223tn; industrial nations dependent on fossil fuels; energy consumption will increase 50% by 2030.</p> <p>Peak oil in 10 years.</p> <p>Developments in harsher environments driving increased use of composites.</p>	<p>Europe makes 70% of passenger rail vehicles in a \$50bn global market.</p> <p>Continued growth estimated up to 10% driven by urban and high speed systems.</p> <p>Emerging pressure on energy use and through life costs.</p>
<p>t by weight, 2nd on in 2011; CAGR</p> <p>ed for 50 years</p> <p>ponents, now</p> <p>structures &</p> <p>high strength</p> <p>long life and</p> <p>ce costs, ease</p> <p>and moulding</p> <p>s.</p>	<p>Marine sector consumes 3.4% by value of global composites.</p> <p>Ships: little current use beyond ancillaries, emerging use in fast ferries.</p> <p>Naval: moving beyond established specialist uses into lightweight topside modules.</p> <p>Leisure: majority of composites consumption in sector, mostly GFRP for volume craft with increasing use of advanced materials.</p>	<p>Driver: corrosion resistance reduces through life costs; weight reduction for topside and deep water locations.</p> <p>Current applications: GRE pipes, topside applications, sub-sea components, structures and repair systems for metal structures.</p> <p>Demand for pipes met locally; cost competition.</p> <p>Emerging applications spoolable pipes and risers.</p>	<p>Rail passenger transport composites sales \$300m in 2009; CAGR of 10.4%.</p> <p>Wide use of non-structural components, mostly in glass, with fire retardant resins necessary for interior applications.</p> <p>Limited use in structural applications for vehicles and infrastructure.</p> <p>Accelerating research activity will impact future rolling stock designs.</p>
<p>er, 250,000</p> <p>ainly SMEs,</p> <p>illion people.</p> <p>%, non-residential</p> <p>structure 16%.</p> <p>0% of UK carbon</p> <p>efficiency, codes</p>	<p>Ships: small shipbuilding and repair capability.</p> <p>Naval: reduced and uncertain MOD surface programmes, continuing sub-surface production.</p> <p>Leisure: continued rationalisation of builders following downturn, total sales estimated at £900m.</p>	<p>Oil & gas provides 73% of UK's energy (49% from UK Continental Shelf).</p> <p>UK has a world-leading supply chain that supplies to the international market.</p> <p>PILOT is UK Govt's Policy Advisory Group, which is developing strategy.</p>	<p>Passenger growth of 75% since 1987.</p> <p>Loss of much indigenous vehicle production capacity ahead of significant demand for new fleets.</p> <p>Innovation must deliver cost reduction and customer targets.</p> <p>UK and EU research forthcoming.</p>
<p>ponents: growth</p> <p>sed acceptance</p> <p>e, low value</p> <p>ctures: UK slow</p> <p>veloping good low</p> <p>s.</p> <p>: developing</p> <p>d good market</p> <p>Barriers are</p> <p>dustry acceptance.</p>	<p>Mostly leisure craft.</p> <p>Historically fragmented, low-technology and low skilled manufacture with strong craft origins.</p> <p>Strong UK design capability; high performance craft construction.</p> <p>Regulations and production costs driving change to closed mould methods.</p> <p>UK builders seeking global competitive advantages.</p>	<p>Strong supply chain for composites products supplying to international market.</p> <p>Significant emerging solutions for spoolable pipes and risers.</p> <p>UK at forefront of international collaborative work to develop standards for composites in the oil and gas sector.</p>	<p>Stable UK supply chain for non-structural rolling stock components and modules, limited lineside supplies.</p> <p>Growing use in rapid installation schemes such as new platforms.</p> <p>2012 Rail Technical Strategy includes Capacity Increase, Cost Reduction and Carbon Reduction, hence interest in lightweighting.</p>
<p>standards.</p> <p>nowledge and</p> <p>t.</p>	<p>Higher level skills required.</p> <p>SMEs will have to comply with tightening regulation.</p> <p>Continuing price pressure from emerging economies.</p>	<p>Low cost competition (e.g. loss of GRE pipe production).</p> <p>Standards enabling take-up of composites.</p>	<p>Highly regulated and complex UK market.</p> <p>On-shore vehicle making capability.</p> <p>Fire performance.</p>

Opportunities by Sector

Aerospace

- Maintain and grow global leadership through composites aero structure technology development.
- New aero engines applications.
- Next generation single aisle programmes.
- Evolution programmes of existing types.
- New suppliers onto existing programmes.
- Provide composites content to emerging aerospace manufacturing countries.
- New composites MRO regimes and techniques.
- UAVs: develop technologies to support demand and ensure UK supply chain has future market share in both defence and civil sectors.

Automotive

- Support and develop UK's world-leading capability in composite motorsport and niche vehicle applications.
- Make step change in processing know-how and develop supply chains for volume production of composites parts to meet UK and global needs.
- Speed up part production by fundamental materials research.
- Reduce cost and time of product development using simulation tools.
- Manufacture lower costs and environmentally friendly products built on a UK composites recycling strategy.

Renewables

- Significant opportunity for the UK supply chain if UK-based offshore wind blade manufacturing facilities established.
- UK moulders to produce nacelles for offshore turbines.
- RenewableUK provide assistance to SMEs in offshore wind market.
- Offshore wind OEMs blade R&D in UK.
- Growth in the UK & international onshore wind market.
- UK composites supply chain to supply to developing marine energy capability.

Proposals for Action

Leadership

1. Work with relevant industry bodies to ensure cooperation on strategy development and facilitate understanding and inclusion of composites requirements.
2. Determine scope, remit and membership of proposed CLF working groups and put them in place.
3. Ensure coordination and linking of strategies to develop composites technology, supply chain and skills in all industry sectors by considering a national Capability Development Programme.
4. CLF members work together to influence government and other bodies to provide support for the proposed Capability Development Programme.
5. Determine areas of highest value to UK plc for future support activities and funding.
6. Strategies to include:
 - retention of the UK's strength in aerospace composites;
 - development of composites structure capability in sectors other than aerospace;
 - volume production of composites components.

Supply chain

1. Determine existing supply chain capability and identify current and potential future gaps.
2. Propose a strategy with relevant partners to fill gaps in capability or capacity and deliver development proposals against a make or buy assessment.
3. Influence policy and funding for support to materials R&D and for a sustainable supply of raw materials where necessary.
4. Make further recommendations on supply chain development; inward investment; relationships; regulatory and financial measures.
5. Support the use of the Hub industry database to identify SMEs that require information about funded projects and other industry support programmes.
6. Map out the enablers category and gaps and determine how future technology development may affect supply chain and business needs.

Construction	Marine	Oil and Gas	Rail
<ul style="list-style-type: none"> • Retrofit buildings to improve environmental performance. • Development and production of integrated composites structures that provide low carbon housing solutions. • Increased use of composites in bridge building and repair. • Use amended guidelines and standards to enable increased use of composites. • Use large demonstrator projects to raise the profile of the use of composites in the industry and to increase understanding and uptake. 	<ul style="list-style-type: none"> • Incorporate smart, multi-function materials. • Adopt rapid product development techniques and improved manufacturing technologies. • Apply knowledge transfer from more advanced composites using sectors. • Automation to reduce cost base for volume produced craft. • Growing demand in emerging economies. • Workboats for offshore energy. • Topsides systems and components for commercial vessels. 	<ul style="list-style-type: none"> • Supply and support through life maintenance of composites products in the harsh offshore environment. • Development of composites use in spoolable pipes and risers. • Repair systems for pipes and structures. • Storage vessels and systems. • FST pultruded products. • Technology transfer with other industry sectors specifically the aerospace sector to enable reduced development cost and times. 	<ul style="list-style-type: none"> • Manufacture items of track infrastructure from recyclates, e.g. sleepers. • Large number of gantries and line-side furniture items using favourable material properties of electrical isolation and corrosion resistance. • Increased take up of composites in passenger rolling stock where a whole system view can be taken, such as new high speed lines. • Considerable UK funding to be applied to the network. • Collaborative research involvement in Shift2Rail projects through EU funding.

Continued over

Technology

1. Instigate a technology roadmapping process that engages with industry sector roadmaps and relevant bodies to draw out composite content.
2. Identify common cross sectoral themes and prioritise focus on areas that will yield the greatest results for UK industry.
3. Ensure material, product design, manufacturing process and enablers development are considered in an integrated way to deliver capability targets.
4. Encourage fundamental materials R&D is linked through to products and processing requirements in technology.
5. Ensure that requirements for future R&D infrastructure are identified and communicated to funders and policymakers and that national composites capability remains fully coordinated.
6. Identify support mechanisms that need to be in place to facilitate composites component manufacturers across the supply chain to develop innovative products and implement competitive manufacturing solutions.
7. Use the results of the roadmapping process to inform and influence government and funding bodies of future strategic priorities and actions.

Skills and learning

1. Develop a strategy to address composites skills requirement at all levels in current and emerging composites-using sectors and work with relevant bodies to establish end-to-end provision.
2. Determine the consequences on workforce demands of technology and manufacturing changes likely to happen due to increased introduction of composites.
3. Promote opportunities to take up composites engineering apprenticeships and optional composites units in other frameworks.
4. Identify routes to widen delivery of composites within HE qualifications.
5. Work to increase availability and value to industry of composites CPD courses.

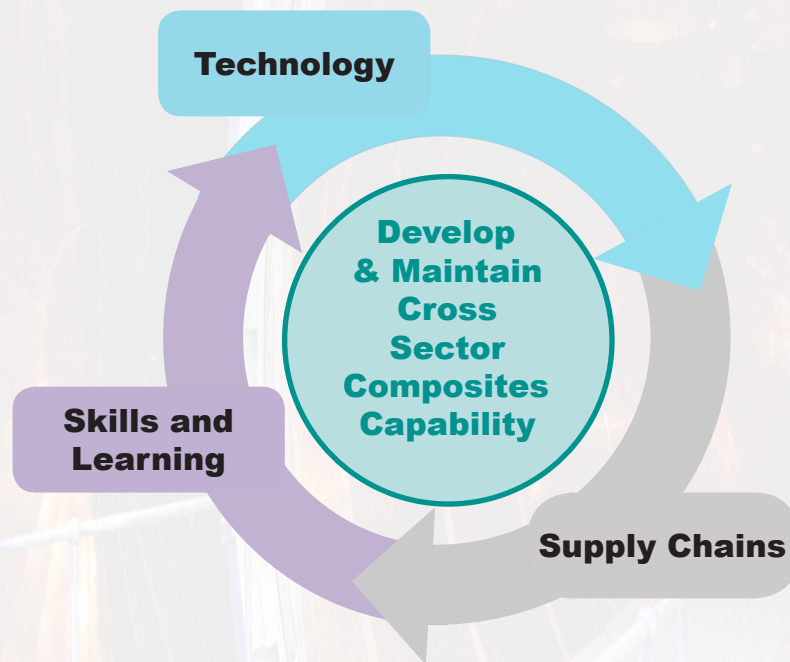
Proposals for Action (continued)

Standards

1. Undertake work to understand regulatory barriers and feedback to other groups.
2. Work with standards bodies to ensure standards facilitate the use of composites, with particular emphasis on construction, rail and oil and gas where significant barriers exist.
3. Link the requirements of standards-setting bodies with opportunities to specify and deliver large demonstrator projects.

Sustainability

1. Influence and encourage sustainability and recycling work as proposed in the 2009 strategy.
2. Develop views on sustainability and recycling for inclusion in future composites strategies to include the influence on component cost.
3. Understand current and future needs:
 - review current capability and state of the art technology;
 - assess future regulatory demand and timescales for recycling; replacement of materials and processes currently used; use of natural/bio materials;
 - evaluate environmental drivers and impacts and where benefits could be gained.
4. Recommend way forward, including feedback to other working groups on actions and plans.



Planning for Future Capability Development

This Study demonstrates that there are a number of related strategic and tactical components necessary to maintain and develop the UK's competitive position in composites. It is suggested that the CLF brings these together to form an integrated programme of Composites Capability Development to assist industry to deliver the opportunities described in this document. Connected, cross sector activities covering technology, supply chain and skills, supported by enabling work on standards and sustainability, will support future industrial direction.

The approach to Composites Capability Development should provide valuable information from a cross sector technology roadmapping

process to identify supply chain gaps and requirements and to inform the supply chain of development needs and opportunities for funding. It will also identify the skills and learning necessary to successfully implement changing and emerging technologies in supply chains. Each element feeds information to the others to integrate and align activities.

Such a programme would ensure that future development of composites technologies will be directly linked to the development of the UK supply chain and its skilled employees thereby greatly reducing barriers to the growth of UK composites capability and increasing the likelihood of industrial success.

Future Delivery

Proposed CLF working groups

Greater CLF involvement in cross sector strategy development in all capability areas will require additional membership and effort. It is therefore proposed that the CLF introduces Working Groups, each with a specific focus on a different element of the Capability Development Programme:

1. Technology
2. Supply Chain
3. Skills
4. Sustainability
5. Standards

The need for the first three is evident from previous reports and strategies. The need for Sustainability to cover recycling and bio-composites and a cross sector approach to Standards has emerged from the work of this Study.

The membership of the Working Groups will be determined in the next stage of work. The Study suggests future actions for each group to consider and prioritise.

Infrastructure partners: the Composites Hub

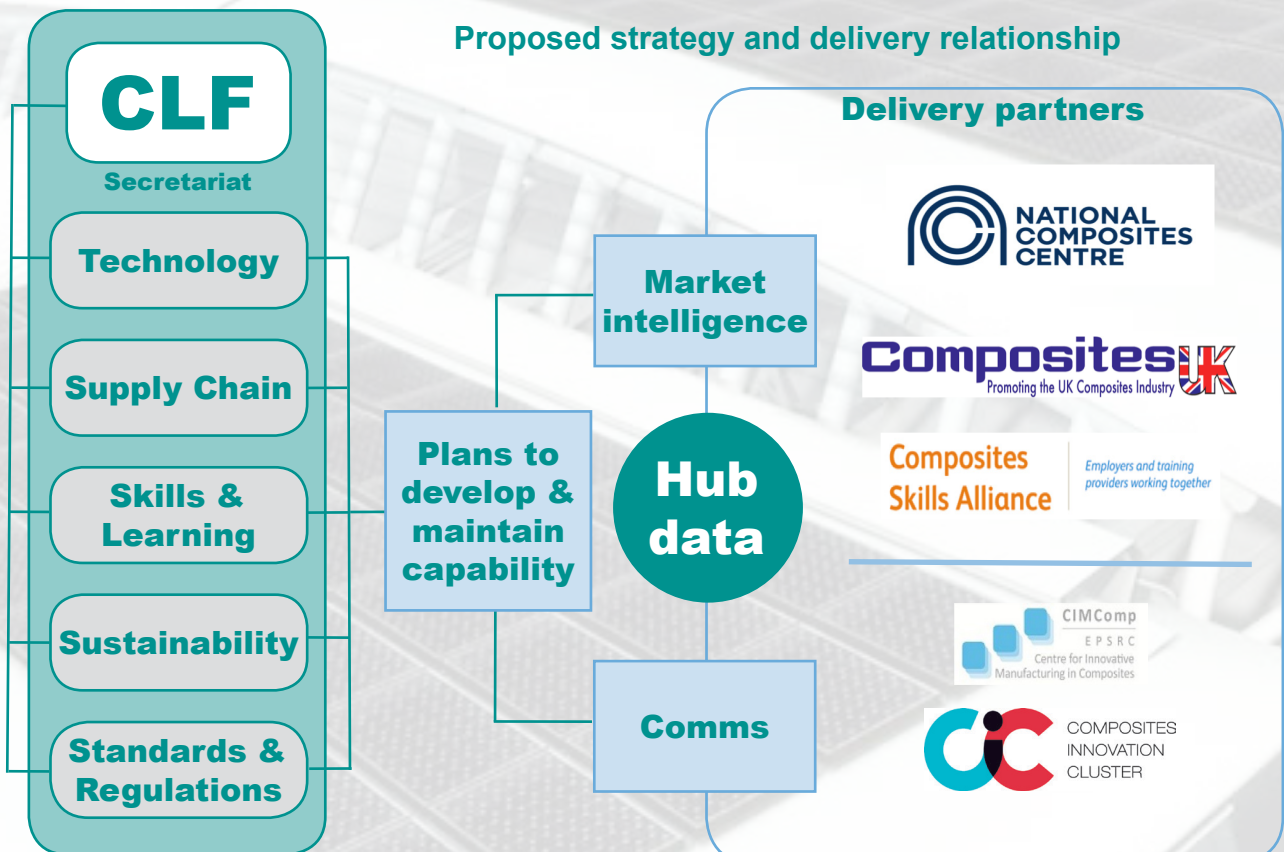
Work to develop and drive capability will be complemented by increased joint working of the infrastructure delivery partners through the Composites Hub. The founding partners are NCC, Composites UK and the Composites Skills Alliance. These are now joined by support delivery programmes such as CIMComp and CiC (which include participation from the initial three within their delivery plans). Arrangements are in hand to ensure the future involvement of Materials KTN and UKTI.

Industry database

A characteristic of the delivery partnership is the sharing of industry information to help shape development and prioritise support to industry. The Hub database will be a mechanism to facilitate joint working and will eventually become a valuable tool to understand supply chain issues.

Communications

The shared Hub database will also enable the delivery partners to improve communications to all in the composites industry, for instance promoting training opportunities in advance of technology implementation.



Full Report

Copies of the full Study are available on request to the chair of the Composites Leadership Forum (please use CLF administration contact below). The full report includes the following sections: Study Methodology, Industry Sectors, UK Composites History and Support, UK Composites Supply Chain Analysis, International Support, Actions and Recommendations, References, Case Studies and details of organisations and companies contacted.

Acknowledgements

The authors received the support of many individuals and organisations, details are provided in the full Study. The Department for Business, Innovation and Skills provided a grant to enable the National Composites Centre to commission this work on behalf of the Composites Leadership Forum. The NCC have also provided support and input to the Study contents.

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Composites Hub Delivery Partners

National Composites Centre.....www.nccuk.com

Composites UK.....www.compositesuk.co.uk

Composites Skills Alliance.....www.composites-skills-alliance.com

CIMCompwww.epsrc-cimc.ac.uk

CiC.....www.the-cic.org.uk