

Sector Qualification Strategy

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Introduction

Introduction to the SQS.

As the Sector Skills Council for science, engineering and manufacturing technologies, SEMTA has a key role in helping to ensure that these industries remain competitive. Remaining competitive and productive requires that action is taken to ensure that the qualifications for the sector are fit for purpose and valued by employers and individuals. SEMTA is working in close partnership with the regulatory authorities and other partners to achieve this long-term goal.

Sector Skills Agreements (SSA) are designed to deliver action to meet priority skill needs that will drive improved business performance. They provide a means whereby employers and employees in each sector can identify skills and productivity needs, the action they will take to meet those needs, and how they will collaborate with providers of education and training so that skills demand can directly shape the nature of supply. For this reason, the SEMTA Qualifications Strategy feeds into

and supports the SSA. Consequently the various strands of research that inform the SSA will also be embedded in the SQS.

The SEMTA Qualifications Strategy has currency across the United Kingdom.

The SEMTA Qualifications Strategy will be kept under regular review and subject to systematic evaluation: it will be updated to reflect national and UK wide strategic qualifications developments.

The SEMTA Qualifications Strategy sets out a vision for a sustainable system of qualifications that is accessible to all and will form the framework for delivery. The SQS may inform the rationalisation of accredited qualifications in the future, and will influence funding bodies across the UK in the distribution of public funds to support the delivery of accredited qualifications.

Section 1: Scope of the SQS

Provide details of the UK-wide scope of the SQS in terms of:

- *sector coverage*
- *occupations covered (including details of any exclusions)*
- *population of learners (who's included within the scope of the SQS and who isn't)*
- *range of provision and types of current qualifications, including HE, apprenticeships, sector/employer training schemes.*

The SQS must be UK wide in scope.

Sector coverage:

In line with the SSA (SEMTA Sector Skills Agreement for the UK Marine Sector, July 2006 and SEMTA Sector Skills Agreement for Electronics, Automotive and Aerospace industries, January 2006) the SQS relates to the following areas: marine; electronics; automotive; aerospace.

Occupations covered:

The SQS provides coverage of general, vocational, academic and professional provision that is relevant to a wide range of occupations covering operative, craft, technician and professional level occupations. This is set out in more detail in the progression charts that accompany this document as set out in Annex A.

Population of learners covered:

Learners

14 to 16 year olds, apprentices, graduates, new entrants and the existing workforce.

Employers

Marine

In total, the marine sector has 56-57,000 direct employees in shipbuilding and repair, boat building and repair, and marine equipment manufacturing. Together these contribute more than £1.9bn to GDP.

In Scotland there are an estimated 6,000 employees, and in Wales 500. Of the 24,000 directly employed, between 15,000 and 18,000 are employed in naval shipbuilding and around 4,000 are employed in merchant shipbuilding, building 25-30 vessels per annum. Approximately 4,000 are employed in ship repair and conversion.

Electronics

UK electronics employment was estimated to be around 263,000 in 2004 and is expected to fall to 240,000 by 2010. Almost 80% of electronics employment is in England, with 13% in Scotland, 6% in Wales and 2% in Northern Ireland. The South East and East of England have the greatest concentration of electronics employment. There were just over 11,000 electronics workplaces in 2004.

The majority of electronics employers are small, with 91% of all sites in the UK employing fewer than 50 people. Only 2% of total UK electronics sites employ 200 people or more. All electronics sub-sectors experienced employment decreases from 1998 to 2002, but at quite different rates. TV and communications equipment showed the largest decrease (32%), while medical and precision

instruments had the lowest decrease (9%). Medical and precision instruments increased their share to 51% of total electronics employment.

Automotive

Automotive manufacturing includes: manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and Sema-trailers; manufacture of parts and accessories for motor vehicles and their engines. Six global groups account for over 80% of world car production. Five groups dominate the world market for trucks and buses. Large multinational firms dominate the components sector.

UK automotive employment was estimated to be around 197,000 in 2004 and is expected to fall to 164,000 by 2010. Just over 90% of automotive employment is in England, with 5% in Wales, 2% in Scotland, and 2% in Northern Ireland. The West Midlands, North West and East of England have the greatest concentration of UK automotive employment. There were nearly 3,000 automotive workplaces in 2004. The majority of automotive employers are small, with 82% of all sites in the UK employing fewer than 50 people. Only 6% of total UK automotive sites employ 200 people or more.

Aerospace

The UK's aerospace industry is a key player in world markets, and a major contributor to the UK economy. In 2003, UK-based aerospace activity stood at £17 billion (a rise of 3.5% in real terms on 2002). Contribution to UK GVA was just under £6 billion. In terms of size this puts the UK aerospace industry 2nd in the world behind the USA. Approximately half was civil turnover and half military turnover. The North West, East Midlands and the South West, Wales, Scotland and Northern Ireland all have similar levels of aerospace employment. The UK aerospace industry has over 700 workplaces and there are approximately 400 MRO sites. More than two thirds of all employees work for the 5% of companies that have over 500 employees, while only 5% work for those with fewer than 50 employees. Large companies in the UK aerospace sector place about 75% of their business with the UK supply chain.

Range of provision:

The range of qualifications covered by this strategy is wide ranging and includes the following:

- GCSEs and vocational GCSEs
- GCE AS / A-Level and Advanced VCE
- Specialised 14 to 19 Diplomas
- Welsh bacalaureate
- Scottish ordinary and higher awards
- Current vocational qualifications in and outside the National Qualifications Framework which are relevant.
- The SQS includes consideration of higher education provision as this is important to ensure that adequate progression routes into and out of higher education are in place. This will also apply to professional qualifications that are offered by the many professional and chartered institutes.
- Post-entry and non-formal provision – including short courses and CPD.
- Apprenticeships – specifically aimed at developing the skills, knowledge and career objectives of people entering the industry.

As SEMTA develops SSAs for further sectors covered within its footprint so too will the SQS be developed to accommodate and reflect the results of this work.

Highlight the key priorities for the sector.

All the pathfinder sectors operate in a highly competitive global marketplace where rapid technological change and the emergence of new international players either as Original Equipment Manufacturers, suppliers or entrepreneurial small businesses are common. This spurs constant innovation and productivity improvement. The global overcapacity in automotive, shipbuilding and electronics demands continuous improvement in all organisations across the sectors in order to remain globally competitive. In automotive and leisure marine, the majority of production is exported. The following drivers have been identified by the sectors as being particularly important:

New product and process development and implementation (NPPDI)

A reduction in NPPDI time is a major contributor to the competitiveness of all sectors although the time from product to market in each of the sectors is very different. For aerospace it may be 12 years to 20 years, whilst in electronics the time to market can be six months and may be as little as

nine weeks. Therefore, skills development interventions for NPPDI need to reflect these differences.

Supply chain management

Supply chain management is identified by employers as a key business and competence issue for achieving global competitiveness. Supply chain integration and management will be increasingly important to achieving world-class standards: this is partly because small supply chain firms need to meet quality and skills requirements of larger firms. One of the risks to future prosperity is the lack of a 'local', world class, supply chain that allows companies to capture a share of high value added markets. Many companies in the supply chain are SMEs and business improvement here is essential. The fortunes of several of the sectors are linked: for example, electronics is part of the supply chain for all the other sectors.

Continuous Improvement and Lean/Process Excellence

Adapting to the competitiveness of the global market is most longstanding in automotive and aerospace where 'Lean Manufacturing'/'Process Excellence' techniques are the respective drivers. All sectors have identified the skills and the related National Occupational Standards embodied in these techniques as key to their future as high performance organisations.

Management and Team Leadership

Both the automotive and aerospace sectors have identified team leadership and front line supervisors (competent in high performance working) as being vital to support world-class lean operation and process excellence. There is a need for a better supply of vocationally qualified team leaders. Skills gaps among managers extend further across all the sectors in terms of knowledge management, project management, financial management, supply chain management and negotiation skills. Automotive, Aerospace, Electronics and Marine have prioritised management and engineering skills.

Increasing the supply of skills at Levels 3, 4 and 5, both through the recruitment of new entrants to the sectors and upskilling of the current workforce.

With companies needing to move to higher value added products to maintain global competitiveness, the proportion of operators in the industry will decline, substantially mirrored by an increasing need for skilled crafts persons, technicians and graduate engineers across the five sectors. In aerospace, it is envisaged that the proportion of graduates in the industry could rise to 50% of the workforce by 2022. There has already been a substantial decline in the numbers of operators in the electronics, automotive and aerospace sectors. This trend will continue, and will be replicated throughout the supply chain.

Indicate how existing government policies in each home nation have been taken into consideration in the production of your SQS.

The SQS is also concerned with the implementation of the Framework for Achievement/Qualifications and Credit Framework, Scottish Credit and Qualifications Framework and the Credit and Qualifications Framework for Wales. As the Framework for Achievement / Qualifications and Credit Framework develops (and the vocational reform programme is implemented) the implications for the qualifications strategy will be considered and necessary changes implemented. Account has also been taken of other initiatives and reports including:

- the Leitch report;
- the 1419 Skills White Papers (2003 and 2005);
- Every Child Matters;
- Qualifications for Apprenticeships Project;
- Employability Guidance;
- Foundation degrees;
- Skills and Employment Action Plan (Welsh AsSemtably government 2005);
- Wales – a vibrant economy (2005);
- Learning Pathways 14 to 19;
- Framework for Economic Development in Scotland;
- Life through learning;
- Smart successful Scotland;
- Determined to succeed (2002);
- Modern apprenticeships;
- Success through skills;
- Jobskills review;
- Essential skills for living strategy;

- Northern Ireland approach to foundation degrees.

The SQS addresses the needs of learners and employers in the sector: this covers knowledge, skills and competence based qualifications.

In the development of action plans to support implementation of the SQS, account will be taken of national and regional priorities including through the Northern Ireland Skills Strategy, Wales Skills and Employment Action Plan 2, Scotland's Lifelong Learning Strategy and Regional Economic Strategies.

At the time of writing the UK-wide Leitch Review of Skills has recently been published. It highlights 'A compelling vision for the UK', within which a commitment to becoming a world leader in skills by 2020 requires major progress in literacy and numeracy; greater achievement at levels 2 and 3 linked to a substantial increase in the numbers of apprentices; and substantially increased numbers of adults qualifying at Level 4.

Skills and Education Strategy in England

There are some important innovations in English skills and training policy that will impact on the skills requirements of the engineering sector. The 2005 Skills White Paper (DfES 2005) builds on the 2003 Skills Strategy. It sets out the Government strategy for ensuring that employers have the right skills to support the success of their businesses and is consequently of relevance to all employers, including those in the automotive, aeronautical, electronics and marine sectors. The White Paper proposes a number of key initiatives:

- National Employer Training Programme (NETP, being implemented as Train to Gain);
- Sector Skills Agreements – bringing together employers and training providers to meet the future skills needs of the nation;
- National Skills Academies;
- Support for adults with free tuition up to the first level 2 qualifications and advice and guidance resources via the telephone and web resources; and
- Qualifications and Credit Framework in England which will apply to Wales and Northern Ireland as well.

The 14-19 Education and Skills White Paper (February 2005) contains some elements that could impact on the sector, particularly around the proposals to improve vocational education and develop Diplomas in 14 broad sector areas. SEMTA is currently leading on the development of the new Engineering Diploma and is also contributing to the development of the Manufacturing Diploma.

The LSC's Agenda for Change and Statement of Priorities (Priorities for Success. Funding for Learning and Skills 2006-08, October 2005, Learning and Skills Council, Ref LSC-P-NAT-050558) focuses on the need to reduce the number of adults without a Level 2 qualification and aims to ensure that provision is demand led, albeit within funding constraints. The Skills for Business Network is crucial in achieving this, as the work Sector Skills Councils do with their employers via the Sector Skills Agreements will set out priorities for sectors and will assist the LSC in making the purchasing decisions that reflect those needs.

Skills and Education Strategy in Scotland

The Framework for Economic Development in Scotland (FEDS) identifies productivity as the key challenge for Scotland, placing skills firmly in the economic development context. FEDS is essentially a long term strategy used to develop the future policies to support economic growth and development in Scotland. It aims to improve productivity via a skills and learning strategy embracing the full range of skills with specific reference as well to manual and vocational skills. The priorities are seen as basic education and skills, research, development and innovation, entrepreneurial dynamism and managing public sector resources.

A Smart Successful Scotland (Scottish Executive 2004) focuses on the skills and enterprise elements of economic development. While FEDS sets out an overall economic vision, A Smart Successful Scotland looks at the skills and enterprise culture required to meet that vision. The emphasis on skills being that it is important to make the best use of human capital and the need to meet the requirements of the future labour market. Productivity is again the focus, reinforcing the message that Scotland cannot be competitive if it relies on being a low wage economy.

Life through Learning: Learning through Life (Scottish Executive 2003) is the strategy for Scotland for lifelong learning, and is principally concerned with post compulsory education and learning. The

aim is to stimulate the support of learning among employers and individuals. The vision of this strategy is to provide the best possible match between learning opportunities open to people and the skills, knowledge and behaviour that will strengthen the Scottish economy and society. It estimates that employers spend £2.2 billion per year on lifelong learning.

The very different nature of the Scottish Credit and Qualifications Framework means that unlike Wales or Northern Ireland, the Qualifications and Credit Framework being developed by QCA will not apply in Scotland.

Skills and Education Strategy in Wales

The Skills and Employment Action Plan for Wales (WAG 2005a), refreshed in January 2005, is focused on ensuring a growing economy for Wales. The aim of the plan is that "The Welsh Government aims for a Wales where everyone has the skills, motivation and opportunity to obtain good quality jobs that meet their aspirations and abilities, and where employers work with their employees and the public sector agencies to raise skills to the highest possible levels to support high quality jobs in a growing economy." There is a recognition that Welsh employers exist in a low skills, low value added culture.

The ELWa interim report "Developing the Workforce: Learning in and for the Workplace" (ELWa 2004) found that provision must be responsive to employers, that there was a need for more bespoke provision for employers, and that employers were looking for improved quality, learning products and delivery. This implies there is a quality issue for providers in general.

Wales: A Vibrant Economy (WAG 2005b) looks for the development of strong and sustainable economic growth. It highlights the importance of certain sectors, including the continued strength of manufacturing.

The Work Based Learning Improvement Plan sets out the UK context of workforce qualifications and the respective penetration of technical or craft level skills for the UK, Wales and various European competitors. Building on this, and in an attempt to improve competitiveness, work based learning programmes have been linked into one portfolio encompassing Skill Build, Skill Build Plus, Foundation Modern Apprenticeships, Modern Apprenticeships and Modern Skills Diploma, with progression into formal education or work related progression pathways through to the Modern Skills Diploma. This is itself an entry qualification for Higher Education. The upper age limit for Modern Apprentices has been lifted, leading to greater take up. There is further ambition to work with employers, the Sector Skills Councils, and providers to develop the necessary training opportunities.

The Credit and Qualifications Framework for Wales (CQFW) aims to address the long-term economic and social sustainability of Wales by embracing all post-16 and higher education.

Skills and Education Strategy in Northern Ireland

The Northern Ireland Skills Strategy 2006 (DELNI 2006) is the crucial policy context for the province. The key challenges for Northern Ireland include raising the general level of skills in the existing workforce, addressing a high level of economic inactivity, and reducing the negative impact of the skills deficiencies on productivity and competitiveness. The aim of the strategy is therefore to help people move up the skills ladder in order to raise skills levels in the workforce.

Section 2: Summary of current qualifications and other learning provision

The SQS should summarise the main types of qualifications and other learning provision used within the sector, to enable their comparison with the main types included in the description of future provision.

Describe the main qualification types, and other learning provision as appropriate, for your sector for all relevant levels indicating their:

- purposes
- interrelationships (including progression routes)
- availability from different providers.

General education qualifications

GCSEs are the principal means for assessing achievement of Key Stage 4 of the National Curriculum. Recently a range of vocational GCSEs (including GCSE Engineering and GCSE Manufacturing) have been introduced. The aims of the vocational GCSEs (Edexcel GCSE in Engineering double award specification 2316 May 2002) are to:

- widen participation in vocationally related learning pre-16;
- allow those students to experience vocationally related learning, to see whether it is suitable for them;
- enable those students to make valid personal choices on completion of the qualification;
- encourage post-16 students to try a vocationally related course, where maybe another programme has previously not proved appropriate for them;
- raise attainment at levels 1 and 2/foundation and intermediate levels of the National Framework of Qualifications.

The broad objectives of these GCSEs are to:

- introduce students to work-related learning;
- provide students with an overview of the sector;
- give students the technical knowledge, skills and understanding associated with the subject at these levels;
- equip students with some of the skills they will need in the workplace or in further education or training;
- empower students to take charge of their own learning and development;
- provide a range of teaching, learning and assessment styles to motivate students to achieve the best they can.

GCE Advanced/Advanced Subsidiary qualifications are broadly designed to provide progression opportunities to further and higher education. The GCE in Engineering has recently been introduced. This qualification has been designed to provide a broad educational basis for further education or for moving into employment within the engineering sector.

The aims of these GCEs (Edexcel Advanced GCE Engineering specification 2004 9731) are to:

- widen participation in vocationally-related learning;
- allow learners to experience vocationally-related learning to see if it is suitable for them;
- enable learners to make valid personal choices on completion of the qualification;
- raise attainment at Level 3/Advanced level of the NQF.

The objectives of these GCEs are to:

- introduce learners to work-related learning;
- provide learners with a broad introduction to a vocational sector;
- give learners the technical knowledge, skills and understanding associated with the subject at this level;
- equip learners with some of the skills they will need in the workplace or in further education or training;
- empower learners to take charge of their own learning and development;
- provide a range of teaching, learning and assessment styles to motivate learners to achieve their full potential.

SEMTA has been supporting the development of the proposed specialised Diplomas. An engineering Diploma has been specified to:

- provide young people with a higher-level education based on an engineering industry driven curriculum
- ensure employment readiness – whichever industry the Diploma student may ultimately choose to enter – via the Diploma's core learning elements; comprising Maths, English, ICT, and personal learning and thinking skills
- allow young people to explore what engineering is about and examine the different opportunities it has to offer – without restricting their future education or career choices
- give them an insight into what work is really like
- provide them with the thinking and learning skills they need for future employment and for self development
- give them a general foundation in engineering principles
- enable them to progress to further and/or higher education if that's what they want to do
- allow them to make better informed choices.

General qualifications are available from a wide range of schools, specialist schools and colleges of further education. SEMTA has established a database of those schools who offer the vocational GCSEs for Engineering and manufacturing: this database is maintained by OSCEng. Information about the work of schools specialising in engineering provision (Engineering Specialist Schools) is available from the Specialist Schools and Academies' trust (www.specialistschools.co.uk) .

Vocational qualifications

A review of provision within the sector was conducted as part of the SSA. Currently it is estimated that there are 499 engineering related vocational qualifications accredited by QCA (Review of National Database of Accredited Qualifications undertaken on 3rd March 2007).

There are, therefore, a wide range of QCA accredited qualifications (applicable across England, Wales and Northern Ireland) and numerous qualifications in Scotland plus a vast range of related undergraduate and post-graduate programmes across the UK. The sectors have a reliance on vocational qualifications and undergraduate and post-graduate qualifications to enable entry into the workplace. A report undertaken by the University of Warwick for QCA (Establishing qualification requirements for engineering, 2003) concluded that:

The sector is well served with a variety of qualifications at each level and on the whole these qualifications meet the industries' current needs.

Many of the existing vocational qualifications are designed to provide specialist work-related qualifications in a range of sectors. They have been developed to provide a preparation for employment and/or to provide career development opportunities for those already in work. They often link to the National Occupational Standards for the sector where these are appropriate and are supported by SEMTA. On successful completion of these qualifications, learners may progress into or within employment and/or continue their study in the vocational area.

There are vocational qualifications that have been specifically designed to meet the requirements of the sectors. For example, the BTEC National Certificate and Diploma in Aerospace Engineering are designed to equip individuals with the practical skills, knowledge and understanding required for success in current employment and progression to future employment as Aircraft Mechanical and Avionic, Mechanics and Technicians working within the Aerospace Manufacture and Maintenance Engineering Industry sector. Other examples are the C&G level 2 Aeronautical Engineering Certificate and the EAL Foundation Certificate in Electronics which also provide progression opportunities. The qualifications may also enable progression to further and higher education. These qualifications will have key aims, for example in relation to the BTEC awards mentioned they are to:

- contribute towards the knowledge, understanding and skills requirements for aircraft maintenance, engineering design, production and technical services level 3 NVQs;
- develop in learners a range of skills and knowledge, personal qualities and attitudes which are essential for career development and progression within the broad aerospace engineering industry and related sectors;
- provide learners with the necessary knowledge and skills concerning health, safety and welfare and the environment and sustainability, as it impacts on and affects the aircraft manufacturing and maintenance engineering sector;
- provide specialised studies directly relevant to individual vocations and professions within the industry in which learners are working or in which they intend to seek employment;
- enable learners to make an immediate contribution in employment;
- focus on the practical application of knowledge and the development of the work-related skills

Technical certificates are vocationally related qualifications identified by SSCs and awarding bodies, that are able to deliver the underpinning knowledge and understanding relevant to the NVQ included in the particular MA framework and:

- are capable of delivery through a taught programme of off-the-job learning;
- permit a structured approach to the teaching and assessment of the underpinning knowledge and understanding of an NVQ (or a suite of related NVQs); and
- retain their original qualification title.

Many colleges across the UK offer some form of engineering related provision. The funding authorities maintain databases of the centres that receive public funding to deliver target qualifications. NFEC's (the National Federation of Engineering Centres) subscribing member organisations consist of both colleges and other publicly-funded providers of learning, and together they deliver over 85% of the post-16 engineering and technology education and training provision in Engineering. Information about NFEC members and the range of provision that is offered is available at www.nfec.org.uk.

S/NVQs

S/NVQs are defined as:

- a statement of competence clearly relevant to work and intended to facilitate entry into or progression in employment and further learning.

These qualifications incorporate specified standards in:

- the ability to perform in a range of work related activities, and
- the underpinning skills, knowledge and understanding required for performance in employment.

S/NVQs are derived, not from an analysis of education and training programmes but from an analysis of present and anticipated future employment requirements. These qualifications are based on national occupational standards that have been set by SSCs: in relation to the sectors covered by this SQS they have been set by SEMTA. They have currency throughout the United Kingdom.

National Occupational Standards (NOS) that form the basis for S/NVQs must:

- reflect best employment practice, benchmarked against European and international standards where appropriate;
- describe the main roles and responsibilities within a defined occupational area;
- describe the outcomes of competent performance;
- take the form of units based on the occupational roles and responsibilities identified;
- include the essential knowledge and understanding required, the relevant technical, planning and problem-solving skills, the ability to work with others, the ability to apply knowledge and understanding, and other skills which will enhance flexibility in employment and opportunities for progression;
- ensure that the competence is broad enough to give flexibility in employment and be capable of adaptation to meet new and emerging occupational patterns and demands;
- meet the needs and have the support of all significant groups of employers and potential users;
- avoid duplication of effort, where at all possible, by looking to adopt other sector bodies' standards which describe the same responsibility or responsibilities.

It is estimated that there are approximately 250 relevant S/NVQs available (Review of National Database of Accredited Qualifications undertaken on 3rd March 2007) across engineering. They are the "...preferred qualifications for work-based learning..." (see page 74 Electronics, Automotive and Aerospace SSA January 2006).

There is no national database of centres that are offering S/NVQs and this information can only be obtained direct from the range of awarding bodies that have been accredited by SQA and QCA. Some information is, however, available from the public funding authorities. Take-up and achievement of S/NVQs has been growing steadily since their introduction and they are widely available through employers, training centres and colleges.

Academic qualifications

The UK Higher Education sector's role in engineering is widely seen as one of the vital contributors to

innovation and economic growth and development.

Higher Education in the UK is diverse in terms of the size and type of institutions offering degrees. At present the Higher Education sector offers a number of different levels of qualification, broadly grouped by level from two year foundation degrees, three and four year undergraduate degrees, one year masters degrees, and three year doctoral programmes. The range of higher level academic qualifications have been categorised and described (see Quality Assurance Agency at www.qaa.ac.uk/students/guides/UnderstandQuals.asp) in terms of summary qualification descriptors:

Certificate level - The holder of a certificate of higher education will have a sound knowledge of the basic concepts of a subject, and will have learned how to take different approaches to solving problems. He or she will be able to communicate accurately and will have the qualities needed for employment requiring the exercise of some personal responsibility.

Intermediate level - Holders of qualifications at this level will have developed a sound understanding of the principles in their field of study, and will have learned to apply those principles more widely. Through this, they will have learned to evaluate the appropriateness of different approaches to solving problems. Their studies may well have had a vocational orientation, enabling them to perform effectively in their chosen field. They will have the qualities necessary for employment in situations requiring the exercise of personal responsibility and decision-making.

Honours level - Graduates with a bachelors degree with honours will have developed an understanding of a complex body of knowledge, some of it at the current boundaries of an academic discipline. Through this, the graduate will have developed analytical techniques and problem-solving skills that can be applied in many types of employment. The graduate will be able to evaluate evidence, arguments and assumptions, to reach sound judgements, and to communicate effectively.

An honours graduate should have the qualities needed for employment in situations requiring the exercise of personal responsibility, and decision-making in complex and unpredictable circumstances.

Master's level - Much of the study undertaken at master's level will have been at, or informed by, the forefront of an academic or professional discipline. Students will have shown originality in the application of knowledge, and they will understand how the boundaries of knowledge are advanced through research. They will be able to deal with complex issues both systematically and creatively, and they will show originality in tackling and solving problems. They will have the qualities needed for employment in circumstances requiring sound judgement, personal responsibility and initiative, in complex and unpredictable professional environments.

Doctoral level - Doctorates are awarded for the creation and interpretation of knowledge, which extends the forefront of a discipline, usually through original research. Holders of doctorates will be able to conceptualise, design and implement projects for the generation of significant new knowledge and/or understanding. Holders of doctorates will have the qualities needed for employment requiring the ability to make informed judgements on complex issues in specialist fields, and innovation in tackling and solving problems.

Professional qualifications

The Engineering Council (UK) maintains the UK national register of professional engineers and technicians. The members must have the appropriate education, training and experience. Agreed members are then categorised as a Chartered Engineer, Incorporated Engineer or Engineering Technician on the register.

Chartered Engineers (CEng) are characterised by their ability to develop appropriate solutions to engineering problems, using new or existing technologies, through innovation, creativity and change. They might develop and apply new technologies, promote advanced designs and design methods, introduce new and more efficient production techniques, marketing and construction concepts, pioneer new engineering services and management methods. Chartered Engineers are variously engaged in technical and commercial leadership and possess interpersonal skills.

Incorporated Engineers (IEng) are characterised by their ability to act as exponents of today's technology through creativity and innovation. To this end, they maintain and manage applications of current and developing technology, and may undertake engineering design, development, manufacture, construction and operation. Incorporated Engineers are variously engaged in technical and commercial management and possess effective interpersonal skills

Engineering Technicians (EngTech) are involved in applying proven techniques and procedures to the solution of practical engineering problems. They carry supervisory or technical responsibility, and are competent to exercise creative aptitudes and skills within defined fields of technology. Professional Engineering Technicians

contribute to the design, development, manufacture, commissioning, operation or maintenance of products, equipment, processes or services. Professional Engineering Technicians are required to apply safe systems of work.

The Royal Charter of the Engineering Council UK empowers it to give formal recognition to those engineering-related professional bodies which satisfy criteria set down in Bye-Laws. A number of those institutions are relevant to the sectors covered in the SQS, including the following:

- Royal Aeronautical Society
- Institution of Engineering and Technology
- Institution of Engineering Designers
- Institute of Marine Engineering, Science and Technology
- Institute of Measurement and Control
- Institution of Mechanical Engineers
- Institute of The Motor Industry
- Royal Institution of Naval Architects
- British Institute of Non-Destructive Testing
- Society of Operations Engineers
- Welding Institute

Apprenticeships

Young Apprenticeships

Young Apprenticeships are offered to the 14-16 age group alongside general curriculum subjects. These Apprenticeships include 50 days of work experience over two years and are only available to those with around average or above average results from the national tests in mathematics, English and science at age 14. An Ofsted review (Ofsted October 2006) of the Young Apprenticeships programme is positive – although engineering needs to improve the proportion of female students as courses tend to be comprised of a majority of male students. Currently there are 3,000 students following this scheme, although this also covers areas of learning outside engineering.

Foundation Modern Apprenticeships (FMAs) and Advanced Modern Apprenticeships (AMAs)

Modern Apprenticeships (MA) were introduced in September 1994. They became fully operational from September 1995. In 2000 MAs were re-branded to Foundation Modern Apprenticeships (FMAs) and Advanced Modern Apprenticeships (AMAs). Responsibility for the Apprenticeship/Foundation Modern Apprenticeship in Engineering and the Advanced Apprenticeship/Modern Apprenticeship in Engineering rests with SEMTA. The engineering sector has perhaps the longest tradition of any sector of using apprenticeship frameworks as a means of providing high quality work based training, leading to Semtai skilled or skilled status. Labour market information gathered by SEMTA, and incorporated into the Sector Skills Agreement indicates an increased requirement for higher-level technicians. Recognising this shift of emphasis within the industry, SEMTA has incorporated a number of new NVQs and Technical Certificates specifically aimed at technicians within the Advanced Apprenticeship/Modern Apprenticeship.

The basic structure of the framework for the Apprenticeship/Foundation Modern Apprenticeship and the Advanced Apprenticeship/Modern Apprenticeship in Engineering are:

Apprenticeship/Foundation Modern Apprenticeship:

Initial Engineering Training (units of PEO NVQ Level 2)

- NVQ Level 2
- Technical Certificate at Level 2
- Key Skills at Levels 1 and 2
- Employment rights and responsibilities (ERR)

Advanced Apprenticeship/Modern Apprenticeship:

Initial Stage Training (PEO NVQ Level 2)

- NVQ Level 3
- Technical Certificate at Level 3
- Key Skills at Level 2
- ERR

In addition SEMTA has been working with the DfES and the LSC on a Higher Apprenticeship Programme at level 4 that will address technician training needs at a higher level than the Advanced Apprenticeship/Modern Apprenticeship.

By far the most well-established route (see “Establishing qualifications requirements” QCA 2003) within the

engineering sector is the Advanced Modern Apprenticeship (AMA). The framework is supported and valued by employers and apprentices value the opportunities it affords them.

Scotland - Modern Apprenticeships

Modern Apprenticeships are run by Scottish Enterprise and Highlands and Islands Enterprise. They are available to those over 16 and can include achievement of level 3 SVQ, Core Skills and additional components (such as units of Higher National Certificates).

Wales - Modern Apprenticeships and Foundation Modern Apprenticeships

These apprenticeships in addition to Skill Build + are available. The Modern Apprenticeship includes NVQ 3 / 4, Key Skills and also specific industry qualifications. The Foundation Modern Apprenticeship includes levels 2/3 NVQs.

Northern Ireland Level 2 and 3 Apprenticeships

Apprenticeship training in Northern Ireland has been under review but from September 2007 the Modern Apprenticeship will be replaced. Pre-Apprenticeships (from Year 11), Level 2 Apprenticeships (16 to 24) and Level 3 Apprenticeships (16 to 24) will be available from September.

Other

Currently, education and training provision within the sector is a mix of qualifications and training. As indicated above, there are a large number of accredited qualifications (on relevant credit and qualification frameworks). However there is also a plethora of non-accredited qualifications that are recognised and used by employers (for example in relation to adult continuing professional development, health and safety, management and supervision, new technology, vendor training).

In addition, there is an ever increasing amount of training available to learners within the sector. Specific skills (sometimes referred to as 'soft skills') identified by employers as essential for work such as communication, customer handling, team-working and problem-solving are often delivered via this type of training. This training (often in the form of workshops) does not lead to any form of accredited qualification and does not include any formal assessment but is often deemed essential by employers. The training is often delivered 'in-house' or by providers from within the sector - industry recognised providers but not acknowledged by any regulatory bodies as quality assured.

According to NESS (National Employer Skills Survey 2003) the commonest form of training across the sectors is job-specific. The training provided by companies includes:

- job specific;
- health and safety;
- new technology;
- induction;
- management;
- supervisory;
- foreign languages.

Progression

Annex A sets out typical progression routes, covering the range of qualifications, for England, Northern Ireland, Scotland and Wales.

Identify any differences in the main types of qualifications within scope across the four UK nations.

Across the UK, there is some degree of commonality with regards the type of qualification available; however, there are some differences that do present challenges for engineering employers and users. The attached progression charts in **Annex A** for England, Northern Ireland, Scotland, Wales describe typical progression routes in terms of the types of qualifications used. The principal difference relates to the national qualifications frameworks where Scotland has currently an additional level of qualifications compared to the rest of the United Kingdom.

Provide an appropriate analysis of the available information about qualifications and other learning provision within the scope of the SQS to support the information presented in section 2.

Information about the range of provision including at the sub-sector level is set out in the Sector Skills Agreements (see especially section 5 of the Marine SSA and section 7 of the EAA [Electronics, Automotive and Aerospace] SSA). Further information about accredited provision is contained within the QCA report on "Establishing Qualifications Requirements in Engineering 2003 Order ref: QCA/04/1287" (see especially sections dealing with Qualifications used for entry to the sector page 15, Occupational qualifications page 17, Vocationally related qualifications (VRQs) page 21, Progression page 32 and Continuing professional development (CPD) page 34).

Overall, UK demographics mean that there are fewer young people entering the labour market. Aerospace, automotive, marine and electronics employers need to ensure that young people with the appropriate skills and qualifications are encouraged to enter the industry, while at the same time up-skilling the current workforce.

The provision and supply issues have been categorised into three areas of people development:

- (i) General Education - covering school to higher education.
- (ii) Technical Competence - which delivers the occupational skills for the workplace.
- (iii) Globally Competitive Interventions to increase profitability by supporting training and development that take into account linkages between organisational, operational and people development.

General Education

The view of employers is that the quality of school leavers does not meet industry's requirements (see page 99 EAA SSA and page 18 Marine SSA). This is a particular problem in England and Wales where employers perceive that there has been an erosion of the maths and science curriculum since the mid-1980s. The perception of employers is that educational attainment levels are higher in Scotland (see page 70, EAA SSA).

School mathematics and science teaching is not delivering numbers or quality of school leavers (see EAA SSA section 7). The number with five good passes at GCSE or equivalent is not expanding rapidly enough to meet the need (not applicable in Scotland). The SSAs draw attention to the following:

- Schools channel talented young people into academic rather than vocational routes.
- There is an urgent need to increase the number of mathematics and science teachers. For the electronics sector, there is a particular need to invest in electronics teaching.
- There is an insufficient supply of highly numerate graduates to meet demand from engineering and other sectors of the economy.
- More links are needed between industry and schools, colleges and HE institutions. There needs to be closer collaboration on the curricula, research and development and the CPD of teaching staff. Industry needs to participate in teaching in schools, colleges and universities.
- Demand across all sectors for intermediate level staff will expand substantially. The supply of technicians and graduates needs to be increased.
- Graduates need more vocational experience.

Technical Competence

The SSAs draw attention to the following:

- Employers find accessing the education and training system complex and confusing. However, there is evidence that employers are satisfied with much of the existing qualifications provision. Qualifications are understood and valued. They are uncertain about the suitability of training and lack knowledge of what is available. This is further compounded by the differences in funding across the UK at national and regional level. Accessing funding is very difficult and complicated.
- Constant re-branding prevents the building of confidence in the qualifications.
- There is a lack of funding for relevant adult training in England and low rates of funding for adults across the UK.
- There is an insufficient supply of specialist IT provision – including CAD, CAM and 3D Modelling.
- Vendor and company-specific training is becoming increasingly important to support capital investment but no funding is available.
- Training providers, particularly FE colleges, need to update their engineering equipment and trainers require constant CPD in order to update their skills.

(see section 7.12 EAA SSA and section 5.3 of the Marine SSA).

Globally Competitive Interventions

The SSAs draw attention to the following:

- Insufficient supply of Lean Manufacturing, Six Sigma and B-IT training at all levels.
- Funding should be supportive of not only technical workforce development but also globally competitive interventions qualifications.

(see section 5.4 Marine SSA and also section iii of 7.12 EAA SSA).

In all these areas of development, information, advice and guidance needs to be improved (page 100 EAA SSA) so that people get the careers advice they need and so that employers can gain access to the education and training they need to upskill their workforce. The delivery of training needs to be flexible as many employers have difficulty releasing staff for training and development. Industry experts are needed as the first point of contact for companies seeking advice.

Provision and supply: policy issues and themes for action

For the industry to be able to respond to the changes in its business environment, it will need to take more control of the key areas in the relationship between demand and supply. The key areas are not new issues and they are deemed to be central to the direction that the Sector Skills Agreement takes. Indeed, the sector has confirmed that it needs to become more actively engaged in the processes that surround the demand and supply issues. In order to increase the effectiveness of public and private investment, four policy issues and three themes for action have been identified that should provide the focus for dealing with the demand and supply issues. These policies and themes for action will enable SEMTA to work consistently and coherently across the key stakeholders to improve the operating environment and to remove a number of the barriers for employer engagement in relation to skills development. These issues are addressed further in the summary of key features set out in **Annex B** to this document.

List of available qualifications

A list of available qualifications is set out in **Annex D**.

Provide detail of

- *What qualifications and other learning provision are currently used/valued and accepted by employers for*
 - *pre-entry and entry to the sector at all levels and*
 - *for the existing workforce at all levels, including professional development at higher levels*
- *Any gaps between the qualifications or learning provision available and what employers want and need*
- *Where there are gaps/needs what needs to be done to address those gaps/needs*
- *Details of where there is employer driven evidence for the rationalisation or development of (new) qualifications or learning provision*

Note: the SQS should not propose arbitrary changes: it should only propose changes for which it can provide strong rationales. Otherwise the SQS will not carry sufficient weight with other stakeholders.

The research underpinning the development of the SSAs shows that employers value and use vocational qualifications as these offer a range of technically-specific skills and some of the work-related skills required for employment.

There are gaps between learning provision currently available and that required by employers and these will be addressed as part of the qualifications strategy. Some of these gaps are currently addressed within the industry through training courses and professional development programmes; however these are often not accredited qualifications.

The key challenge for sector employers concerns eligibility for funding and accreditation for the training that they provide to their workforce in-company. The qualifications strategy will seek to identify solutions and a range of options. The lack of public funding for essential vocational training for adults is one of the barriers that limits take-up and hence creates the skills gap evident across the UK, which is of great concern for engineering employers. This is an area that will be tackled through direct work with LSC.

Undergraduate and post-graduate provision is well recognised by employers as an indication of educational attainment. However, employers have also expressed concern at the lack of skills required for the workplace shown by graduates.

Our consultations with employers and other partners have identified a number of issues associated with current provision. In particular there is a need for:

Flexible delivery

Employers across all sectors have highlighted that there is a need for training to be more flexible to meet their needs and to be more easily accessible.

Relevance

Employers would welcome rationalisation, not in terms of reduction of numbers of qualifications but rather in more transparency of qualifications linked to NOS and better quality assurance.

Provision to address skill gaps

Analysis of skills issues shows that there are areas in need of improvement, including the insufficient supply of Lean Manufacturing, Six Sigma and B-IT training at all levels.

Work readiness

Employers have expressed concern as to the work readiness of graduates and school leavers.

The following sections address use and value as well as gaps across the range of qualifications provision.

General qualifications

As mentioned previously the view of employers is that the quality of school leavers does not meet industry's requirements (see page 99 EAA SSA and page 18 Marine SSA). This is a particular problem in England and Wales where employers perceive that there has been an erosion of the maths and science curriculum since the mid-1980s. The perception of employers is that educational attainment levels are higher in Scotland (see page 70, EAA SSA).

School mathematics and science teaching is not delivering numbers or quality of school leavers (see EAA SSA section 7). The number with five good passes at GCSE or equivalent is not expanding rapidly enough to meet the need (not applicable in Scotland).

The perception of employers is that educational attainment levels are higher in Scotland and, therefore, they do not appear to be as concerned about the mathematical and scientific abilities of students leaving school in Scotland. Indeed, the Employer Skills Survey (ESS) shows that 55% of employers in Scotland in all industries say that recruits from school are well prepared for work. The EEF have highlighted (see EEF Bridging the continental divide, 2004) two factors in relation to secondary education that are impacting negatively on productivity:

- The quality of school leavers does not meet the industry's requirements.
- There is a need to focus on the shortage of qualified teachers in science subjects.

EEF also found that the image of the sector has a negative impact on attracting people with the right skills into the industry and that advice from the careers service is inadequate. Electronics employers have identified an erosion of the curriculum in mathematics and science since the mid-1980s (see ESSG 'Observations on London (Edexcel) A level Mathematics', 2004). This has increased the gap between employers' requirements and the ability of students. It also has a knock-on effect on higher education programmes, which have to start at a lower level or provide initial bridging courses to bring the mathematical ability of undergraduates to the minimum required level. Aerospace, automotive and marine employers identified similar issues.

Electronics employers see an urgent need to upskill and invest in electronics teaching capability and increase the number of mathematics and science teachers. Industry needs to have an active involvement in electronics teaching in schools, colleges and universities. The Electronics in Schools Initiative is one initiative that tries to address the requirements of the electronics sector in secondary education. This initiative was originally funded by the DTI and is available in selected regions of England only.

To address these issues SEMTA will undertake a range of actions including:

- Continuing to lead the development of the Engineering Specialised Diploma.
- Support the programme of work of the workforce development partners for the Specialised Diploma to help develop the capacity and capability of teachers and providers.
- Continue to support implementation and the development of support materials for the GCSE and GCE in Engineering and in Manufacturing.
- Establish a 14 to 19 forum to involve key partners to develop an agreed action plan and associated programme of work.
- Developing and agreeing action plans with partners including to address the key features identified for general 14 to 19 qualifications (see **Annex B**).

Vocational qualifications

About one quarter of all learners in the engineering sector are enrolled on learning aims that are either 'not certificated' or 'not recognised' (not in the National Qualifications Framework) training. Employers would like to see the funding of these reduced, so that investment can be concentrated on the qualifications recognised by the industry. However, this needs to be considered carefully, since some of this activity will be for 'community learning' that the local LSC believes is required. Also, some of the learning may not be strictly 'work-based', but work-related in that it prepares people for work. There is also provision funded where the LSC believes there is a local need. SEMTA is working with the Federation of Awarding Bodies and the Joint Council for Qualifications in its work relating to rationalisation (Strand 4) and has already taken action to support the withdrawal of some low take awards. This work will continue through liaison with SEMTA's Engineering Awarding Body forum and through SEMTA's membership of the Strand 4 board.

Table 1 below provides an indication of the take-up of vocational qualifications that are available:

Table 1: VRO awards (as reported by participating awarding bodies) by sector subject area, by level and gender 2005/6 UK

Subject area	Total awards	Level of award			Gender	
		1	2	3	Male	Female
Engineering and manufacturing technologies	125,000	13,900	62,700	48,400	118,200	6,700

Source: National Statistics, vocational qualifications in the UK 2005/6.

As previously mentioned some employers find accessing the education and training system complex. However, there is evidence that employers are satisfied with much of the existing qualifications provision. They are uncertain about the suitability of training and lack knowledge of what is available. This is further compounded by the differences in funding across the UK at national and regional level. Constant re-branding prevents building confidence in the qualifications.

To address these issues (see section 7.12 EAA SSA and section 5.3 of the Marine SSA) SEMTA will undertake a range of actions including:

- Work with the LSC to address the issue of a lack of funding for relevant adult training in England and low rates of funding for adults across the UK.
- Work with providers to support the development of an improved supply of specialist IT provision – including CAD, CAM and 3D Modelling.
- Vendor and company-specific training is becoming increasingly important to support capital investment but no funding is available and this will be addressed direct with the LSC.
- As training providers, including FE colleges, need to update their engineering equipment and trainers require constant CPD in order to update their skills, there will be direct work with NMSA to propose an agreed programme of work.
- The insufficient supply of Lean Manufacturing, Six Sigma and B-IT training at all levels will also be addressed direct with LSC and NMSA to agreed action plans aimed at improving supply.
- Ways in which funding should be supportive of not only technical workforce development but also globally competitive interventions qualifications will also be addressed direct with LSC and NMSA and an agreed action plan developed.
- Work with awarding bodies through the Awarding Body Forum (that covers all four nations of the UK) to develop and agree action plans, including to consider the way in which the key features (see Annex B) for vocational qualifications can be addressed. There will also be continuing work with awarding bodies aimed at achieving a rational framework of vocational qualifications that are used and valued by employers.

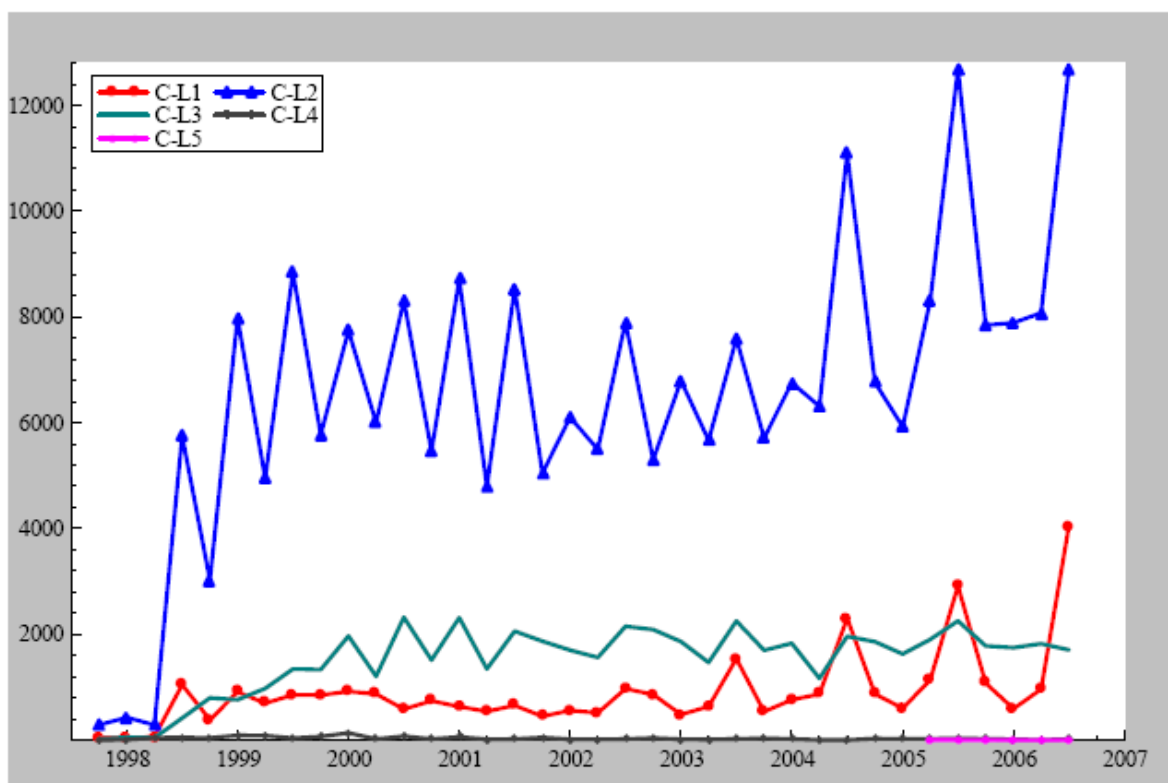
- Work in partnership with NFEC (the National Federation of Engineering Centres) and the GTA network to agree an action plan.

S/NVQs

In the engineering manufacturing sector, N/SVQs have been identified as the preferred qualification for work-based learning (see EAA SSA 2006, section 7.3.2). A strong commitment from the industry to using these qualifications, particularly at Levels 1-3, has been demonstrated over the past nine years. The trends in the numbers of registrations and certifications is shown in Tables 2, 3 and 4. The level of certifications is at its highest level.

Table 2.

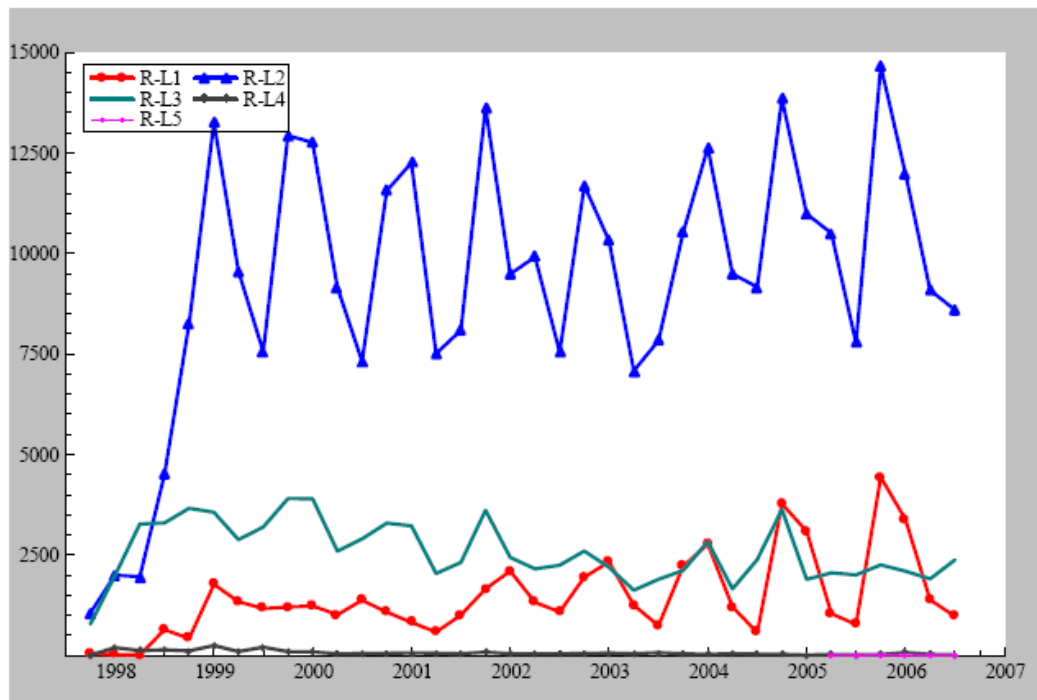
Certifications S/NVQs Levels 1 to 5 to Q3 2006



Source: SEMTA quarterly data reports on S/NVQs

Table 3.

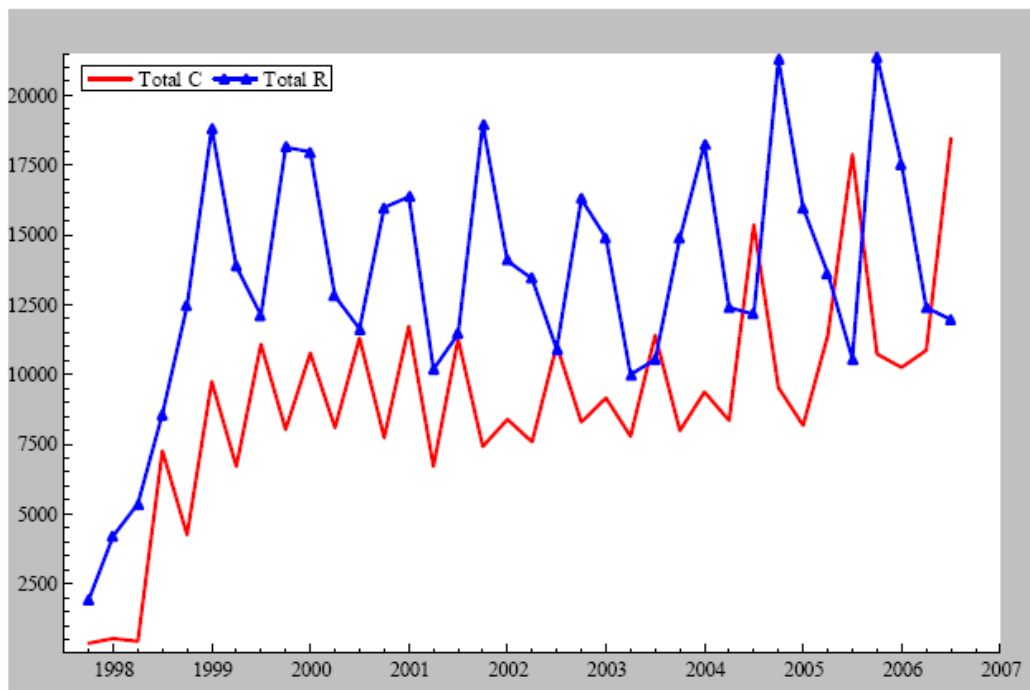
Registrations S/NVQs Levels 1 to 5 to Q3 2006



Source: SEMTA quarterly data reports on S/NVQs

Table 4.

Total certifications and registrations to Q3 2006



Source: SEMTA quarterly data reports on S/NVQs

There are a number of areas in which gaps – for National Occupational Standards and S/NVQs - have been identified. A programme of work has been specified for the coming year to address these gaps. It is hoped that there will be funding available to support this work. The proposed programme of work is set out in **Annex C**. There will be a need to ensure significant levels of resource on an annual basis to ensure that NOS and the qualifications based on them will be up-to-date and reflect the new technologies and working practices required by employers.

Action will also need to be taken to address the implications for NOS and S/NVQs of the emerging requirements of the Qualifications and Credit Framework, Scottish Credit and Qualifications Framework and the Credit and Qualifications Framework for Wales. SEMTA is currently engaged in a project (funded by SEMTA) to explore ways in which the existing NOS might form part of the credit frameworks. If employers are to support this there will be a need to ensure that: there is a UK wide approach; the arrangements do not result in distorting NOS; the estimated benefits outweigh expected costs. There will be resource implications arising from this work that will require discussion with SSDA and other partners.

SEMTA will continue the work of its Awarding Body Forum (that covers all four nations of the UK) to address issues of rationalisation and quality assurance. This group will also be used as a way to help ensure effective communications with partners and to plan and deliver continued coherence in the provision of S/NVQs. The key features for S/NVQs (see **Annex B**) will also be addressed through the development and agreement of action plans with awarding bodies and other partners including the regulatory authorities QCA and SQA.

Academic qualifications

A search of the UCAS (Universities and Colleges Admissions Service) courses database undertaken in March 2007 indicates that there are a large number of Masters degrees, first degrees, foundation degrees and higher level awards available in these sectors. The search shows that there are:

- 221 degrees and higher level courses available in aeronautical and aerospace engineering;
- 113 degrees and higher level courses available in automotive engineering;
- 822 degrees and higher level courses available in electronic and electrical engineering;
- 16 degree and higher level courses available in marine engineering.

Tables 5 and 6 provide summary information about the number of degrees awarded in engineering.

Table 5.
First degrees awarded by cohort

Source: HESA

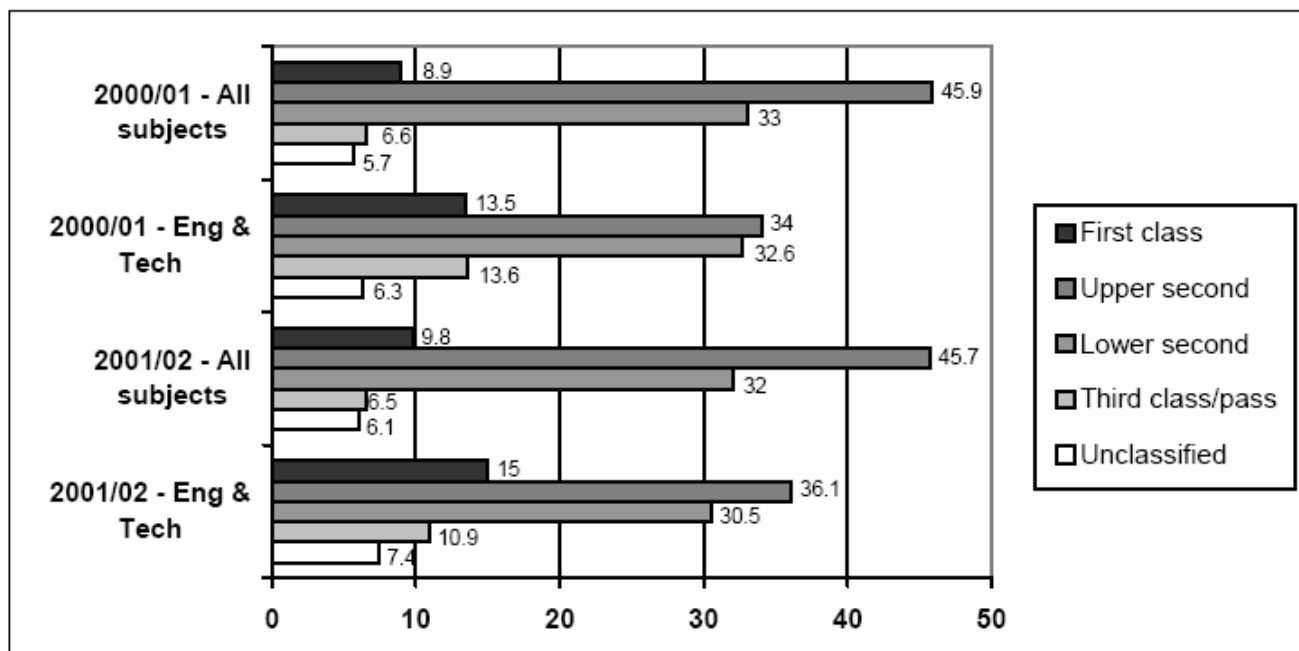


Table 6.
Students in higher education in Scotland by year, level of study and subject group, 1995-96 to 2004-05

	Total	Engineering and Technology
Total		
1995-96	214,260	24,425
1996-97	238,095	23,810
1997-98	247,655	23,700
1998-99	255,965	23,715
1999-00	259,390	22,140
2000-01	262,915	22,135
2001-02	272,625	22,940
2002-03	267,025	21,225
2003-04	271,865	20,685
2004-05	276,705	20,890

Source Scottish Executive statistics

All four sectors have identified the need for higher level skills (see section 7.5.1 EAA SSA 2006 and also section 5.2 of Marine SAA, 2006). A number of issues have been identified that SEMTA will address through implementation of the qualifications strategy including:

- Working with the DfES and other partners to consider ways in which the supply of maths and science teachers can be increased.
- For the electronics sector, there is a particular need to invest in electronics teaching. SEMTA will seek funding to enable the development of resources to support the continued implementation and development of the GCSEs in Engineering and Manufacturing. SEMTA will also seek to ensure that resources to support the implementation and future delivery of the engineering specialised diploma will provide coverage of electronics.
- Working with others to develop the supply of highly numerate graduates to meet demand from engineering and other sectors of the economy.
- Working with partners such as the Education Business Partnerships, the Higher Education Academy (HEA) and the SSAT to help promote more links between industry and schools, colleges and HE institutions.
- Liaising with the HEA to encourage the provision of opportunities for graduates to gain more vocational experience.

The key features for degrees and higher education qualifications will also be addressed through the development and agreement to action plans with awarding bodies, HEA and other partners including the Quality Assurance Agency for Higher Education.

Professional qualifications

The registration of engineers in engineering is of great importance to the sector. The existence of Chartered Engineers within companies, particularly national and global operators, demonstrates a key message to other major industry players of the companies' capability and is viewed as an international benchmark.

There is considerable concern in the industry regarding the falling numbers of registered engineers (Chartered Engineers, Incorporated Engineers and Engineering Technicians) and the increasing age profile (see Table 10). By 2003, the number of Chartered Engineers registered had fallen to 141,000, while there were 39,000 Incorporated Engineers and 12,000 Engineering Technicians. In fact, the number of Chartered Engineers has fallen nearly 4% over 10 years, and the number of Incorporated Engineers by 22% and Engineering Technicians by 21%.

Tables 7, 8 and 9 set out summary data about the numbers of registered engineers including trends in relation to the numbers of new entrants.

Table 7
Numbers of registered engineers (source EC UK)

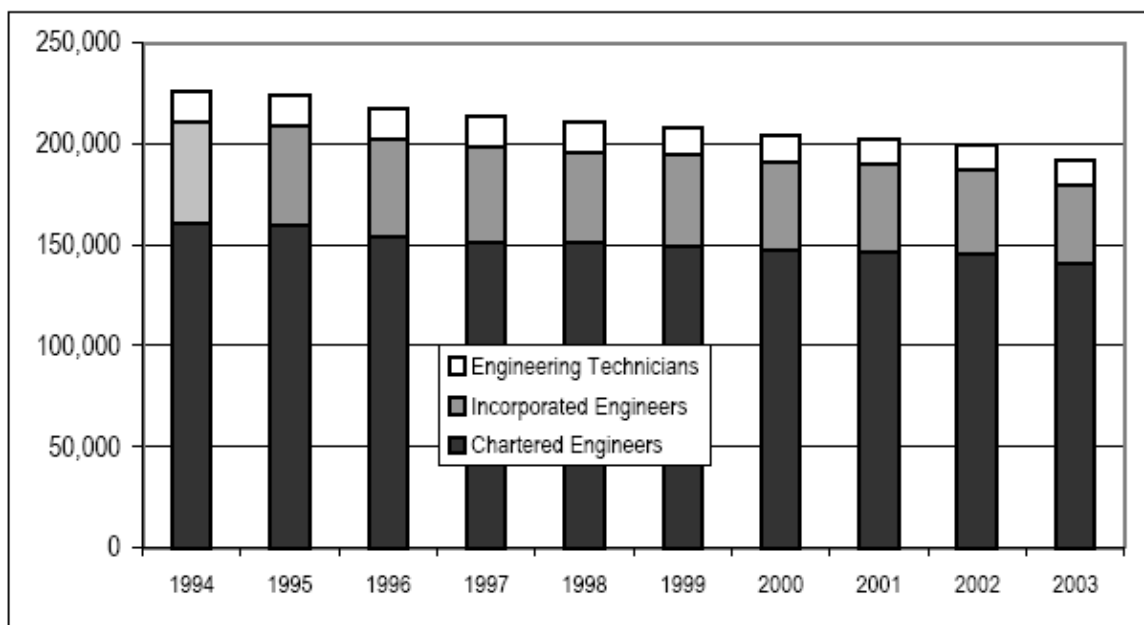
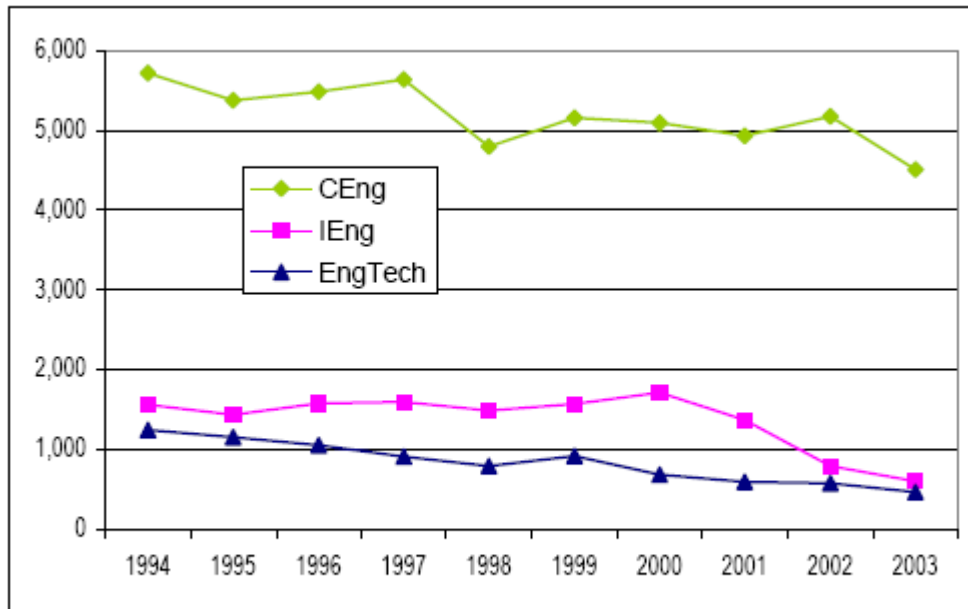


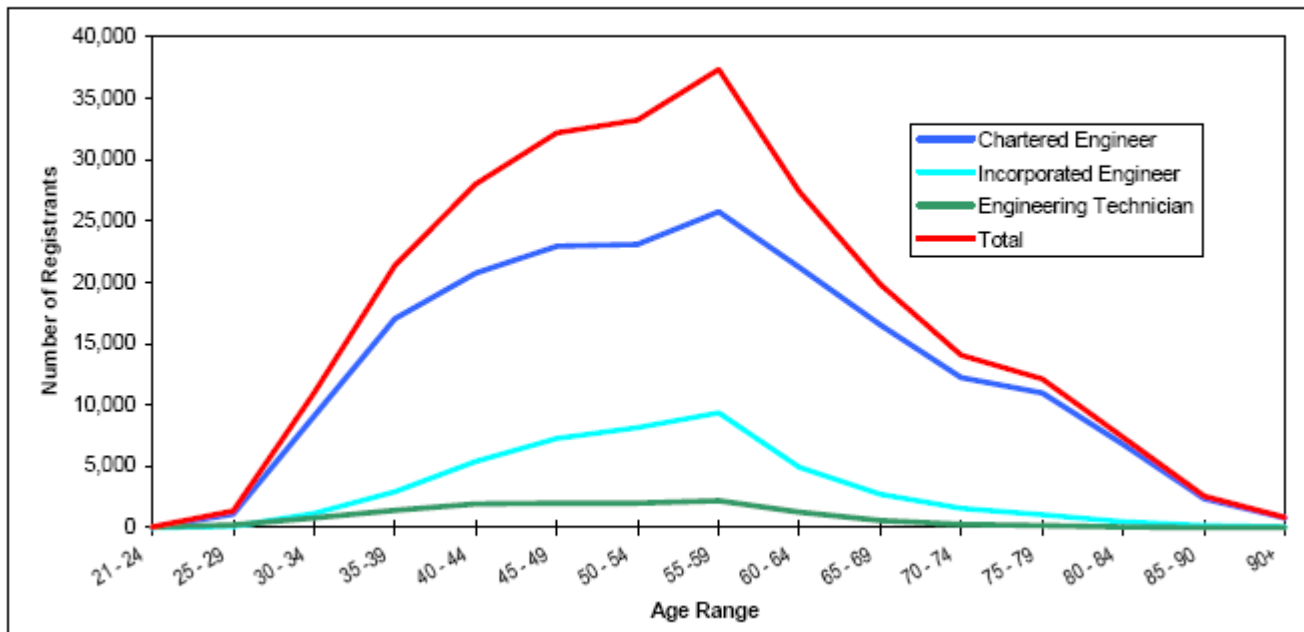
Table 8
New registrants



Source: EC (UK)

Table 9
Registrants age profile

Source: EC (UK)



The requirement in the industry is for a far higher proportion of Incorporated Engineers and Engineering Technicians compared with the proportion of Chartered Engineers. This is the situation in Europe, where the role of the technician is held in higher esteem (see section 7.5.3 EAA SSA, 2006).

SEMTA will work with partners including the range of professional bodies and the Engineering Council UK to promote the benefits of registrations. We will also work with partners to encourage progression: there may be a need to ensure that there continue to be clear and direct links between the qualifications developed with SEMTA in order to meet the requirements for registration.

Apprenticeships

We estimate that there are about 25,000 apprentices and other recognised trainees in the engineering sector. The apprenticeships in marine engineering are new but are being well received. However, the success rate for Advanced Apprentices in England and Modern Apprentices in Wales is low (57% in 2002-3 and 44% in 2003-4) for AMAs in 2002-3 and 2003-4. The success rate for Apprenticeships in the same years was 46% and 43%. In Scotland and Northern Ireland the success rate was 67% and 65% respectively. Failures to achieve the full Apprenticeship Framework mask the fact that candidates do gain individual credit against the components. The Framework has been set as the combination of standards needed by employers, but many candidates are failing to achieve the whole package of qualifications. In Scotland, some Core Skills (similar to Key Skills) are assessed as an integral part of the qualification and the training plans are monitored. The policy of separate assessment of Key Skills should be changed and more monitoring introduced. Pre-apprenticeship schemes, such as that run by Babcock Engineering Services, also increase retention and success rates, as do better selection techniques. Improved information, advice and guidance could help other companies to adopt similar practices. In Scotland, monitoring contributes to the level of success. It would also be useful to do further research on the reasons for higher success rates among apprentices in Northern Ireland.

Despite using the brand name "Apprenticeship" because it is highly regarded, there seems to be little recognition of the need to build the reputation of a qualification. This re-branding does not build confidence in the frameworks, and may result in employers and candidates not regarding them in such high esteem. Most recently, for example, the English Foundation Modern Apprenticeships have become Apprenticeships and Advanced Modern Apprenticeships have become Advanced Apprenticeships, although Wales have not followed suit. Scotland meanwhile has retained the brand Modern Apprenticeship and this may contribute to the higher achievement rates there. (see section 5.3 Marine SSA, 2006)

Industry is unanimous that the policy on funding for adult training (i.e. for learners aged over 24) is an obstacle and needs to be changed (see Marine SSA, page 22).

Training for apprentices, available at Sementai-skilled and skilled levels, is offered across the four nations: England, Scotland, Wales and Northern Ireland. The basic characteristics remain true to the original concept put together in the mid- 90s when Modern Apprenticeships were introduced. They are based on N/SVQs at Level 3 or 4, vocational education and key skills and core skills in Scotland. England has by far the largest apprentice population of the four nations with approximately 6,000 starts per year on Advanced Apprenticeships (AAs) and a population of 21,000 in training, based on an average 42-month programme. There are 5,950 starts per year on Apprenticeships or 8,950 in training, based on an 18-month programme. In the last two years, there has been a dramatic shift from Advanced Apprenticeship starts to Apprenticeship starts. This is concerning as SSA skills needs analysis indicates a need for higher-level skills over the next ten years. However, early research has identified that significant numbers of Advanced Apprentices have started on Apprenticeships and then upgraded to Advanced Apprentices purely for funding reasons. Completion rates for the engineering apprenticeship framework in England are disappointing at 30%. However, there are two significant factors to be taken into consideration. First, training providers were penalised for transferring trainees from the Apprenticeship Programme to the Advanced Apprenticeship programme, in that transfers were coded as non-completers. This has now been resolved and transfers are coded differently by the LSC. Secondly, with the loss of 'Other Training' (NVQ training only), training providers are 'nesting' trainees in the apprenticeship programme with no intention of completing the framework. Completion rates for the Advanced Apprenticeship are 51%, according to LSC data.

Scotland operates a craft/technician Modern Apprenticeship programme (MA) and has a substantial apprentice population with 750 starts per year on average over the last two years, or an in-training population of 2,250 based on average 36-month programme. Scotland still retains the level 4 (technician) capability within the MA programme and is, therefore, in a better position to react to the higher-level skills demands identified by employers in the skills needs analysis. Framework completion rates in Scotland are currently running at 66%. This figure is higher than in England, partly due to Core Skills in Scotland being embedded into the SVQ and vocational education programme - as such, no separate evidence is required.

Northern Ireland has a relatively small population of apprentices. ETCNI figures indicate that there are approximately 70 starts per year (although this excludes apprentices at some large companies), equating to an in-

training population of 210 based on a 36-month rolling programme. Both craft and technician routes are offered, although technician activity is currently confined to Level 3.

Wales operates a craft/technician apprenticeship and has an apprentice population with 660 starts per year on Modern Apprenticeships (name still retained in Wales) and 395 starts on average over the last two years on Foundation Modern Apprenticeships. This gives in-training figures of 2,310 based on a 42-month programme (AMA) and 590 based on an 18-month programme (FMA). Completion rates for AMA and FMA are both 43%. Wales has opted to forego the necessity for external assessment of Key Skills and this should have a beneficial impact on completion rates in the future.

Therefore, in order to fully restore the capability of the Advanced Apprenticeship in England and Wales to meet the demands of training high grade technicians, we would recommend the following:

- Restore NVQ Level 4 as a funded pathway in England.
- Restore the HNC/HND as a 'proxy' technical certificate.
- Introduce a Foundation Degree as an alternative to a technical certificate for academically able candidates.
- Accredite all the above with IIE as meeting 'Technician Engineer' requirements

(see section 7.4 EAA SSA 2006)

As a result of employer demand, and in consultation with employers in the aerospace, automotive and electronics sectors, SEMTA has developed a Higher Apprenticeship in Engineering Technology in England and Wales. The aim of the Higher Apprenticeship programme is to increase the number of high-level engineering technicians and incorporated engineers by 1,000 per year for the engineering, manufacturing and technology sector. The requirement is to develop clear pathways to engineering technician and incorporated engineer careers, and professional institution registration for school or college leavers, advanced apprenticeship achievers, direct entry adults and adults from the workforce. This will help to rectify the higher level intermediate skills shortage identified by the aerospace, automotive and electronics sectors. As well as trying to improve the already established links between larger employers and HE/FE, it will also aim to engage SMEs in the employment and training of engineering technicians / incorporated engineers by establishing SME clusters around HE/FE and training provider establishments. It will also encourage the development of Foundation Degree programmes to meet learner, employer and sector needs (section 7.4.7 EAA SSA, 2006).

SEMTA's Marine Sector Strategy Group is strongly in favour of developing a Higher Apprenticeship for the marine sector just as employers in automotive, aerospace and electronics are doing for their sectors (Marine SSA, see page 20).

SEMTA is participating in a pilot project to consider the extent to which some of the issues that have been identified could be addressed through the development of a specific Qualification for Apprenticeships. This project will produce an interim report in June 2007 and the recommendations arising from this work will be considered by SEMTA's national training frameworks sub-committee.

Qualifications to meet the needs of adults

As part of the development of this qualifications strategy there has been a consultation with employers and other partners (including higher education, colleges, training providers, professions). The feedback from the consultation has indicated that there is overwhelming support for the development of qualifications that are relevant to what adults can achieve through informal training and development. This is addressed in more detail in section 5 of this document.

Section 3: Other Sector Uses of Qualifications

The SQS analyses the ways in which qualifications are used to meet sector-specific need.

Describe any use made of qualifications for the regulation of practice within the sector.

Registration as engineer

Under its Royal Charter, ECUK regulates the engineering profession in the UK and formally represents the interests of UK engineers abroad. It is a Designated Authority under the current General Systems Directives.

The engineering profession in the United Kingdom is regulated by ECUK through 35 engineering Institutions (Licensed Members) who are licensed to put suitably qualified members on the ECUK's Register of Engineers. The Register has three sections: Chartered Engineer, Incorporated Engineer and Engineering Technician. These titles are protected by the Engineering Council's Royal Charter and may only be used by registrants.

In general there is no restriction on the right to practise as an engineer in the UK. Registration, which is renewable annually on payment of a fee and provided that there has been no violation of codes of professional conduct, is recognised as desirable in many fields of engineering employment and provision of engineering services but is not mandatory. There are a small number of areas of work, generally safety related, which are reserved by Statute to licensed or otherwise approved persons.

All candidates for registration as Chartered Engineer, Incorporated Engineer or Engineering Technician must satisfy the competence standards set by ECUK and be members of the appropriate Licensed Member engineering Institution. Applicants must show that they have a satisfactory educational base, have undergone approved professional development, and, at interview, must demonstrate their professional competence against specific criteria.

Licence for aircraft maintenance engineers

Virtually all countries of the world belong to the International Civil Aviation Organisation (ICAO), a part of the United Nations. Each ICAO member state must licence those people who will certify civil aircraft which are registered in the country concerned. Since ICAO lays down standards for licensed technicians, in a document called ICAO Annex 1, most countries develop a licensing system which complies with this standard.

The European NAAs have joined together as the Joint Aviation Authorities (JAA). This organisation has no basis in law and its members are the National Aviation Authorities (NAA) of the European states. Its rules take the form of Joint Aviation Requirements (JARs). These are not regulations but are adopted by each NAA and so become, in effect, regulations for the country concerned. In the near future a European Aviation Safety Agency (EASA) will replace the JAA and this new body will be able to make regulations for all states signed up to the new body. The aim of the JAA/EASA is to standardise regulations throughout Europe.

The JAA system has produced three important JARs relating to aircraft maintenance. They are:

JAR66 Maintenance Certifying Personnel
JAR 145 Aircraft Maintenance Organisations
JAR 147 Maintenance Training Organisations

The JAR 66 licence complies with ICAO Annex 1.

Describe any specific use made of qualifications to promote customer confidence and to protect consumers / the public within the sector (see Guidance for examples).

Qualifications are sometimes used by employers in the engineering sector to provide evidence of quality to support applications for ISO 9000 and IIP. This is an area that will be considered in the future development of qualifications for adults (see section 5).

Describe how the sector uses qualifications in Scotland, Northern Ireland, Wales and England (where appropriate).

There is little variation across the four nations as legislation and regulation for the sector is UK wide. The sector uses of qualifications in England, Northern Ireland, Scotland and Wales are the same.

Section 4: Sector Working Environment

The SQS provides an overview of the key features of the sector-specific working environment(s) together with an indication of the numbers of people employed within these environments.

Explain special features or characteristics of the working environment that need to be taken into account to help to inform the design, delivery and assessment of appropriate learning provision to ensure that it is accessible to the existing and future workforce.

The principal area in which change and development has been identified and agreed is in relation to addressing the needs of providing certification for training which is work based and in many cases of an informal nature. This is addressed in more detail in section 5 of this document.

Throughout the work to develop sector skills agreements we have seen the need for good information advice and guidance on training. The March 2005 DfES Skills White Paper for England and the Skills and Employment action plan for Wales identify workforce development brokerage as a gap in the business support portfolio. It recognises that brokers will need to be skilled and experienced to be effective. In the view of the Marine Sector Strategy Group, these brokers need an understanding of the best practices in the sector and how the company can measure its own performance on a basket of measures. There is a substantial international body of benchmarking in shipbuilding that demonstrates irrefutably that productivity increases as companies adopt better practices. However, companies need to benchmark themselves in order to identify the key areas in which improvement can measurably enhance the bottom line. No such benchmarking has yet been done in boatbuilding, although the forthcoming work by KPMG for DTI will provide information on competitiveness.

Some companies in all parts of the sector compete globally and/or operate in more than one country. These organisations pass on the pressures of global competition to their supplier companies by demanding that they achieve certain standards of quality cost and delivery (QCD). These standards include the need to measure supplier performance and help underperforming companies to improve. The need to adopt modern manufacturing techniques is thereby pushed down the supply chain to smaller companies, who are then under commercial pressure to invest and train, in order to meet their customers' standards.

The operation of market pressures through the supply chain will increase as business improvement skills expand. Governments' policies should be designed to encourage training in business improvement at all levels, and also support companies who have taken the commercial decision to invest and train as a result of market pressures. The changes in policy proposed in this report, alongside an effective brokerage system staffed by business analysts, are important elements of a strategy to raise employer demand, improve skill use and deployment and ensure responsive supply-side activity.

The delivery of learning and recording of achievement in bite-size chunks is likely to be supported by the sector. This may help training and qualifications to become more accessible for some sections of the workforce.

Additional systems to recognise prior experience and/or achievement eg APEL/APL will also contribute to improving access to relevant training across the sector.

Provide an analysis of sectoral workforce trends for the future and any changes forecast to the working environment.

Marine

In total the marine sector has 56,000 employees in shipbuilding and repair, boat building and repair and marine equipment manufacturing. Together they contribute more than £1.9bn to GDP. In Scotland there are estimated to be 6,000 employees. In Wales there are estimated to be 500 employees. Of those directly employed, between 15,000 and 18,000 are directly employed in naval shipbuilding and around 4,000 are employed in merchant shipbuilding, building 25-30 vessels per annum. Approximately 4,000 are employed in ship repair and conversion (see Marine SSA, 2006)

Electronics

UK electronics employment was estimated to be around 263,000 in 2004 and is expected to fall to 240,000 by 2010. Almost 80% of electronics employment is in England, with 13% in Scotland, 6% in Wales and 2% in Northern Ireland. The South East and East of England have the greatest concentration of electronics employment. There were just over 11,000 electronics workplaces in 2004. The majority of electronics employers are small, with 91% of all sites in the UK employing fewer than 50 people. Only 2% of total UK electronics sites employ 200 people or more. All electronics sub-sectors experienced employment decreases from 1998 to 2002, but at quite different rates. TV and communications equipment showed the largest decrease (32%), while medical and precision instruments had the lowest decrease (9%). Medical and precision instruments increased their share to 51% of total electronics employment (see EAA SSA, 2006).

Automotive

Automotive manufacturing includes: manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and Semtai-trailers; manufacture of parts and accessories for motor vehicles and their engines. UK automotive employment was estimated to be around 197,000 in 2004 and is expected to fall to 164,000 by 2010. Just over 90% of automotive employment is in England, with 5% in Wales, 2% in Scotland, and 2% in Northern Ireland. The West Midlands, North West and East of England have the greatest concentration of UK automotive employment. There were nearly 3,000 automotive workplaces in 2004. The majority of automotive employers are small, with 82% of all sites in the UK employing fewer than 50 people. Only 6% of total UK automotive sites employ 200 people or more (see EAA SSA, 2006).

Aerospace

The UK aerospace industry, including companies in the supply chain, employed nearly 122,000 people in 2003 (a rise of 4% on 2002). In addition 150,000 are employed indirectly within the UK and a further 30,000 in the US. The largest proportion is employed in aircraft and systems. According to the SBAC, a substantial part of indirect employment has been transferred to the supply chain over the last 5 years. 15% of employees are engaged in R&D, a rise of 20% on 2002. Aerospace employment levels fell between 2001 and 2002 after a number of years of growth. The SBAC consider the after effects of the September 11th terrorist attacks to be the primary contributor to this. From SEMTA/IER estimates, based on aerospace SIC 35.3 (93,000 employees) and estimated MRO activity (30,000 employees), total UK aerospace employment was 123,000 employees in 2004. The aerospace sector accounts for just under 0.4% of total UK employment. In terms of total employment, aerospace is most important for Northern Ireland (0.46%) and least important for Scotland (0.12%) [see EAA SSA, 2006].

Explain any special features or characteristics of the working environment for Scotland, Northern Ireland, Wales and England, as appropriate.

None.

Section 5: How the SSC or SSB Will Help Realise the Future

The SQS presents a description of future provision for the sector which should inform the detailed Action Plans. It outlines the actions by which the SSC or SSB intends to help realise its view of the future by helping to prepare materials and by collaborating with other relevant stakeholders.

Describe the sector's view of the future in terms of qualifications and other learning provision. These should be the anticipated outcomes of implementing any action the sector intends to take.

Vision for the sector

There are a variety of vocational qualifications available and on the whole these meet the sector's needs (see especially the QCA report 'Establishing qualification requirements – engineering, 2003'). There are well established progression routes within the sector as a whole including into work-based learning, further, higher and professional education. In order to provide for progression it is necessary to offer a range of qualifications including those that meet the requirements of the professions and entry to higher education. There is a need to encourage constant and timely updating so that the qualifications keep pace with new technology and processes and a flexible approach to the delivery and assessment strategies employed. The sector values both the NVQ and VRQ routes, and also uses a well-established apprenticeship framework. There are well-established progression routes within the sector as a whole, including into higher education. There are also good routes for those entering and working at operator, craft and technician level but fewer established routes for movement between those levels.

The range of provision and progression available at present (as set out in the progression charts included in Annex A) are therefore supported by the sector and reflect the vision for the future that should be maintained. Within this context over time the aim is to achieve a range of objectives that have emerged from the sector skills agreements as follows:

- The right person trained in the right skills at the right time.
- Maximum opportunity for employers to make the right choices.
- Available progression and transferability routes within and between sectors.
- Employers can decide who to train and with which training providers.
- Flexible delivery of up/cross skilling in bite-sized chunks that attract credits.

Strategic Objective 1 (SO1)

To address skills gaps and shortages especially in relation to new product and process development and implementation, supply chain management, management and leadership.

SO1 Qualifications should:

- Address skills gaps and shortages in relation to management development including: knowledge management; project management; change management; risk management; financial management; negotiation; entrepreneurial management; application skills; customer relationship; general management; new technologies; people management; developing the workforce.
- Develop enhanced capability and capacity in relation to strategic and commercial leadership, team leader and first line supervisor training and use B-IT national occupational standards to benchmark programmes.

Strategic Objective 2 (SO2)

To promote the achievement of continuous improvement and lead/process excellence and globally competitive levels of competence, capability and productivity.

SO2 Qualifications should:

- Further develop supply chain competence at intermediate and above levels that will address the supply of capability and capacity of the provision network.
- Increase the penetration of global competitive standards (including the broadening of NOS to cover level 5 occupations and generate appropriate related qualifications, increase the capability of the FE and provider network to deliver B-IT related programmes and qualifications).
- Encourage upskilling to get products and services more quickly from concept to market and help remain globally competitive (including the development of new NOS to deliver new product and process development and implementation and related programme sand qualifications and to develop the capability of provision to support and deliver NPPDI programmes and qualifications).

Strategic Objective 3 (SO3)

To maximise recruitment of new entrants to the sectors and to increase participation in apprenticeships at all levels.

SO3 Qualifications should:

- Be designed to support the higher apprenticeship in engineering technology.
- Encourage the development of strategies and programmes to maximize recruitment into sectors.
- Be designed to help increase participation on graduate apprenticeship programmes.
- Be designed to help increase participation in apprenticeships and programmes.

Strategic Objective 4 (SO4)

To ensure that qualifications and relevant provision is appropriate to and meets the needs of employment and supports workforce development.

SO4 Qualifications should:

- Help increase the vocational relevance of degree programmes (including sandwich degrees).
- Help to promote demand-led provision that will improve the capability and capacity of the provider network to meet the needs of employment.
- Aim to promote the upgrading of operator skills to at least N/SVQ level 2 and to retrain operatives and support their redeployment within the workforce at level 3.
- Be developed to meet the needs of specific employers including specialist (bespoke) degree programmes with higher education institutions.

Continuing professional education and development for adults

The principal area in which change and development has been identified and agreed is to address the providing of certification for training which is work based and in many cases of an informal nature. Most work-based training tends to be based on legislative need or vendor training and is driven by 'business need', as opposed to qualification driven.

The issue some companies express is that National Vocational Qualifications can be perceived as overly bureaucratic. Perceived bureaucracy can act as a barrier to companies getting involved.

Yet most companies do train their employees – however, the training they give, in the most part, is not recognised (in qualification terms). This is not a problem to the company but does not help the individual who nowadays is bound to be employed over their lifetime by a number of employers.

It is proposed that a new system is developed for the sector under the banner of SQS. The system would offer companies complementary provision in addition to the NVQ system and would still be based on the same National Occupational Standards that NVQs use.

The new system would be available to all companies who wished to participate.

The system would be externally validated and certificated.

Summarise how the SSC or SSB will work with partners to realise its view of the future and action plans through dialogue, as appropriate, with

- *employers*
- *government departments*
- *funding agencies in the four countries*
- *review authorities (eg, QAA), accrediting authorities (eg, professional bodies that grant exemptions for university courses), and the qualifications regulators (ie: SQA, CCEA, DELLS and QCA)*
- *awarding bodies*
- *learning providers*

Capability and capacity building

In order to encourage and promote the development of the delivery network – from the school curriculum through to higher education – employers require a quality and validated approach to delivery. This is important because it will help to ensure that providers of education and training will have the capability and capacity to deliver key programmes of learning that will help to drive up competitiveness and skills. Critical issues will include:

- Supply – ensuring the availability of the appropriate number of centres/schools to meet

- Vocational context – making sure that the learning environment delivers the right vocational context.
- Qualified and competent staff – ensuring that there are adequate numbers of qualified and competent teachers, trainers, lecturers, assessors, verifiers, examiners and moderators to meet demand.
- Capital resources – ensuring the provision of access to sufficient and fit for purpose capital resources.

To ensure that qualifications meet the needs of the sector employers have stated that it is vital that they are designed, structured and delivered in ways that will help to build capacity. This will have different implications for different types of qualification. Some of the required features are:

- UK coherence – qualifications should support the longer-term aim for coherence and consistency across the four nations.
- Flexibility - flexible delivery in bite-sized chunks which attract credits.
- Standards based – qualifications should be unit based where possible and should be directly related to relevant national occupational standards.
- Assessment – criterion referenced and fit for purpose.
- Employability – qualifications should meet the sector’s need for employability.
- Transferability – qualifications should promote and encourage transfer of achievements.
- Entry and progression – qualifications should be designed, developed and promoted in ways that encourage recruitment and progression.

A summary of the required or key features for the various types of qualifications provision is set out in **Annex B: Key features**.

Looking to the future - action plans and the reformation of current qualifications

- It is intended that action plans will be developed and agreed with key partners.
- Action plans will form part of the Qualifications Strategy.
- Action plans will be regularly reviewed and assessed.
- A template to support the development of consistent action plans has been developed.
- Master Action Plans will be produced for England, Northern Ireland, Scotland and Wales.
- Master Action Plans will in time be developed to include activities and outcomes for a range of partners including the following:
 - National Manufacturing Skills Academy
 - Specific action plans for each partner
 - Schools
 - FE
 - HE
 - Professions
 - Awarding bodies
 - RDAs
 - GTAs
 - Funding bodies
 - Regulators
 - SSDA (such as NOS and apprenticeships)
 - Other partners

As previously stated in section 2 of this qualifications strategy a number of actions will be taken to address the wide range of issues that have been identified. These actions will include the following:

General qualifications

- Continuing to lead the development of the engineering specialised Diploma.
- Supporting the development of the Manufacturing Diploma.
- Support the programme of work of the workforce development partners for the specialised Diploma to help develop the capacity and capability of teachers and providers.
- Continue to support implementation and the development of support materials for the GCSE and GCE in Engineering and in Manufacturing.
- Establish a 14 to 19 forum to involve key partners to develop an agreed action plan and associated programme of work.
- Developing and agreeing action plans with partners across the UK to address the key features identified for general 14 to 19 qualifications (see **Annex B**).

Vocational qualifications

- Work with the LSC to address the issue of a lack of funding for relevant adult training in England and low rates of funding for adults across the UK.
- Work with providers to support the development of an improved supply of specialist IT provision – including CAD, CAM and 3D Modelling.
- Vendor and company-specific training is becoming increasingly important to support capital investment but no funding is available and this will be addressed direct with the LSC.
- As training providers, including FE colleges, need to update their engineering equipment and trainers require constant CPD in order to update their skills there will direct work with NMSA to propose an agreed programme of work.
- The insufficient supply of Lean Manufacturing, Six Sigma and B-IT training at all levels will also be addressed direct with LSC and NMSA to agreed action plans aimed at improving supply.
- Ways in which funding should be supportive of not only technical workforce development but also globally competitive interventions qualifications will also be addressed direct with LSC and NMSA and an agreed action plan developed.
- Work with awarding bodies through the Awarding Body Forum (that covers all four nations of the UK) to develop and agree action plans including to consider the way in which the key features (see **Annex B**) for vocational qualifications can be addressed. There will also be continuing work with awarding bodies aimed at achieving a rational framework of vocational qualifications that are used and valued by employers.
- Work in partnership with NFEC (the National Federation of Engineering Centres) and the GTA network to agree an action plan for a programme of work aimed at seeking to secure improvements.

S/NVQs

- There are a number of areas in which gaps and the need for incremental change – for National Occupational Standards and S/NVQs - have been identified. A programme of work has been specified for the coming year to address these gaps. It is hoped that there will be funding available to support this work. The proposed programme of work is set out in **Annex C**. There will be a need to ensure significant levels of resource on an annual basis to ensure that NOS and the qualifications based on them will be up-to-date and reflect the new technologies and working practices required by employers.
- Action will also need to be taken to address the implications for NOS and S/NVQs in relation to the emerging requirements of the Qualifications and Credit Framework, Scottish Credit and Qualifications Framework and the Credit and qualifications Framework for Wales. SEMTA is currently engaged in a project (funded by SEMTA) to explore ways in which the existing NOS might form part of the credit frameworks. If employers are to support this there will be a need to ensure that: there is a UK wide approach (SEMTA will implement arrangements for moderation of the outputs of work on credit); the arrangements do not result in distorting NOS; the estimated benefits outweigh expected costs. There will be resource implications arising from this work that will require discussion with SSDA and other partners.
- SEMTA will continue the work of its Awarding Body Forum to address issues of rationalisation, quality assurance. This group will also be used as a way to help ensure effective communications with partners and to plan and deliver continued coherence in the provision of S/NVQs. The key features for S/NVQs will also be addressed through the development and agreement to action plans with awarding bodies and other partners including the regulatory authorities QCA and SQA. In order to support the development and implementation of qualifications to encourage improving business performance a Forum for Business Improvement Techniques Awarding Bodies will also be formed.

Academic qualifications

- Working with the DfES and other partners to consider ways in which the supply of maths and science teachers can be increased.
- For the electronics sector, there is a particular need to invest in electronics teaching. SEMTA will seek resources to enable the development of resources to support the continued implementation and development of the GCSEs in Engineering and Manufacturing. SEMTA will also seek to ensure that resources to support the implementation and future delivery of the engineering specialised diploma will provide coverage of electronics.
- Working with others to develop the supply of highly numerate graduates to meet demand from engineering and other sectors of the economy.
- Working with partners such as the Education Business Partnerships, the Higher Education Academy (HEA) and the SSAT to help promote more links between industry and schools,

- Liaising with the HEA to encourage the provision of opportunities for graduates to gain more vocational experience.
- The key features for degrees and higher education qualifications will also be addressed through the development and agreement to action plans with awarding bodies, HEA and other partners including the Quality Assurance Agency for Higher Education.

Professional qualifications

- SEMTA will work with partners including the range of professional bodies and the Engineering Council UK to promote the benefits of registrations. We will also work with partners to encourage progression: there may be a need to ensure that there continue to be clear and direct links between the qualifications developed with SEMTA in order to meet the requirements for registration.
- SEMTA will continue to support the work of OSCEng (the occupational Standards Council for Engineering) especially in relation to the maintenance and updating of Engineering Competence Reference Standards.
- We will work with the Engineering Council UK on mapping of National Occupational Standards to the UK Specification and to promote recognition in relation the registration as Engineering Technician.

Apprenticeships

- SEMTA will work with partners to lobby for a number of changes in relation to apprenticeships including:
 - Restoration of NVQ Level 4 as a funded pathway in England.
 - Restoration of the HNC/HND as a 'proxy' technical certificate.
 - Introduction of a Foundation Degree as an alternative to a technical certificate for academically able candidates.
 - Accreditation all the above with IIE as meeting 'Technician Engineer' requirements
- SEMTA's Marine Sector Strategy Group is strongly in favour of developing a Higher Apprenticeship for the marine sector just as employers in automotive, aerospace and electronics are doing for their sectors. Action will, therefore, be taken to encourage and support the development of a higher apprenticeship for the marine sector.
- SEMTA is participating in a pilot project to consider the extent to which some of the issues that have been identified could be addressed through the development of a specific Qualification for Apprenticeships. This project will produce an interim report in June 2007 and the recommendations arising from this work will be considered by SEMTA's national training frameworks sub-committee.

Qualifications to meet the needs of adults

- A project group will be established to help drive forward the development of proposals for new or revised qualifications to meet this need.
- A timetabled programme of work will be agreed with partners.
- Discussions will be arranged with LSC and other funding authorities.
- Liaison will be established with the regulatory authorities to consider ways in which emerging qualifications can be recognised as accredited provision within the national credit and qualifications frameworks.
- Through the work of SEMTA's engineering awarding body forum a dialogue with awarding bodies will be established to ensure that appropriate qualifications and quality assurance arrangements can be developed.
- An action plan will be developed with NMSA that will provide a focus on supporting the development of capacity and capability.
- Liaison will be established with NFEC and GTAs to consider the potential role of providers.
- Arrangements for the approval of sector qualifications will be developed with LSC within which the place of the proposed qualification will be clarified.

Describe how you will prepare or help with the preparation of information and materials, including the areas that action plans are likely to focus on at UK, national and regional levels. For example:

UK Wide (e.g.):

- *NOS related work, including e.g.*
 - *Updating of NOS and other related products (assessment strategies, qualifications structures etc)*
 - *Development of new NOS*

Nation-specific (e.g.):

- *Modern Apprenticeships in Scotland*
- *Review of level 2 entitlement in England*
- *CQFW in Wales*

SEMTA has already established an internal sector qualification reform project team to ensure that the overall vision of the SQS addresses the needs of England (and its regions), Northern Ireland, Scotland and Wales. This will ensure there is an integral sector skills council approach to the implementation of the strategy.

Sector strategy groups for each sector have already been established and they will help to review specific elements of the reform e.g. new qualification development, apprenticeship frameworks.

As previously stated (see section 2) there are a number of areas in which gaps and the need for incremental change – for National Occupational Standards and S/NVQs - have been identified. A programme of work has been specified for the coming year to address these gaps. It is hoped that there will be funding available to support this work. The proposed programme of work is set out in **Annex C**.

Annex A:

Progression maps

Annex B:

Key features

Annex C:

Proposed programme of work for 2007/8 to develop and carry out incremental change to national occupational standards associated with S/NVQ qualification structures and assessment strategies

Annex D:

List of available qualifications