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*Cheylesmore House
Quinton Road
Coventry CV1 2WT
Telephone 024 7686 3000
Fax 024 7686 3100
Website www.fefc.ac.uk*

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Executive Summary

The Purpose of the Report

1 The Further Education Funding Council (the Council) has a duty to secure sufficient and adequate facilities for further education (FE). The Council and the regional committees regularly review provision to ensure that the duties of adequacy and sufficiency are being met. This report contributes to that review process and to the wider development of the skills agenda.

2 The report is intended to provide a source of information on training and skill development needs in the engineering industry, in particular on the role that FE colleges play in meeting these needs.

The Research Activity

3 The proposal to carry out the study was launched at a meeting of industry bodies in May 1999. A steering group drawn from colleges and the industry supported the work of the Council.

4 The report is based on a literature review and discussions with industry groups and members of the steering group. Analysis of provision in colleges is based on the Council's Individualised Student Record (ISR) database for the years 1994-95 to 1997-98 and college strategic planning information.

The Structure of the Report

5 The report has four main chapters:

- Chapter 2 examines the key skills and training issues for the engineering sector with sections that relate to national training organisations (NTOs)
- Chapter 3 presents an analysis of data on actual and planned provision in FE colleges
- Chapter 4 reviews the work of NTOs, giving two examples of analysis of provision at NTO level
- Chapter 5 presents an analysis of provision for computer aided drafting and design
- Chapter 6 provides a summary and recommendations.

The Council's website contains additional information used in preparing this report and some further analysis of that information.

The National Skills Task Force

6 The work on this report takes account of issues identified by the National Skills Task Force concerning the skills requirements of the engineering industry.

Learning to Succeed

7 The Department for Education and Employment (DfEE) published a white paper in June 1999 that lays out a new agenda for the development of post-16 education and training and proposes the establishment of a new Learning and Skills Council (LSC).

The Engineering Industry

8 Engineering is a major industry sector. The total engineering output in the United Kingdom (UK) amounts to approximately £160 billion, representing about 8% of total UK gross domestic product (GDP). Some 1.7 million people are employed in the engineering industry in the UK, which has fewer small firms and more large employers, than national industry averages. London has more small engineering companies than other regions. There is a concentration of automotive and traditional manufacturing companies in the West Midlands.

9 Engineering companies will increasingly need to recruit people with different and higher-level skills than those required in traditional craft trades. A recent survey by the Engineering Employers' Federation (EEF) predicted that there will be a reduction of 20% to 25% in the numbers of people employed in the industry over the next ten years. In the same period the workforce will need to become more highly skilled, with a higher proportion of graduates and technicians and a lower proportion of unskilled and semi-skilled labour.

The Further Education Colleges' Contribution to Engineering Training

10 Engineering accounts for 7.2% of students in FE colleges. Of the 423 FE colleges in England, 365 offer some provision in engineering, and 150 of these account for 80% of all provision. Over 30% of all students are recruited in Greater London and the South East.

11 The main characteristics of students recruited to engineering provision in colleges are:

- 89% of students are men
- 56% of all enrolments are at level 1 or level 2
- 18% of engineering students are from non-white ethnic minorities.

12 There was a decline in full-time enrolments in 1998-99, although colleges forecast steady growth over the next three years.

13 There are 25 NTOs that have some link with the engineering industry and 16 that are responsible for key areas of provision. The report contains an analysis of provision in the electrotechnical and motor industry areas.

14 The FE sector has responded to the demand for training in computer aided drafting and design. The report contains an analysis of the patterns of provision that have emerged in response to demand from students and employers.

Purpose and Scope of the Report

1.1 This report is about the nature and scale of engineering courses in FE colleges in England and the extent to which these courses meet the needs of the engineering industry.

1.2 The FEFC has a duty, set out in the Further and Higher Education Act 1992, to secure sufficient and adequate facilities for FE. The Council and its regional committees regularly review provision in all the major occupational areas to ensure that the duties of adequacy and sufficiency are being met.¹ This report contributes to that process.

1.3 In compiling the report, it has become clear that there is a lack of robust information on which to determine the needs of the industry. There is also a lack of consistency and coverage of data on the full range of publicly funded education and training in the engineering industry. This report contains an analysis of the provision in FE colleges.

1.4 Additional reference material can be found on the Council's website (www.fefc.ac.uk).

National Skills Task Force

1.5 The National Skills Task Force was set up to assist the Secretary of State for Education in developing a National Skills Agenda. The task force is intended to provide advice on:

- the nature, extent, geographic and industrial pattern of skills needs and shortages (together with associated recruitment difficulties) and how the UK can monitor these effectively on an ongoing basis
- practical measures to ease skills and recruitment difficulties, and help to raise the level of sustainable employment, in both the short and longer term
- the likely changes in the longer-term skills needs of the economy and the extent to which these needs will be met on the basis of existing trends

¹ In previous years, some Council and regional committee reports have commissioned further investigation to ensure that sufficiency and adequacy is being met. No insufficiencies or inadequacies in engineering provision have been identified.

- adult learning in the workplace, management skills and public funding and planning
- how best to ensure that the education and training system responds effectively to the needs identified.

1.6 The National Skills Task Force has produced three reports:

- *Towards a National Skills Agenda*, First Report of the National Skills Task Force, DfEE, September 1998
- *Delivering Skills for All*, Second Report of the National Skills Task Force, DfEE, June 1999
- *Tackling the Adult Skills Gap*, Third Report of the National Skills Task Force, DfEE, February 2000.

It plans one further publication:

- a final report in spring 2000, drawing together all the recommendations to suggest an appropriate framework for a coherent and longer-term National Skills Agenda.

1.7 Some of the principal issues emerging from the work of the National Skills Task Force that are relevant to this review of engineering provision in FE are as follows:

- skills shortages are often localised, in the sense of being specific to quite narrowly defined occupations in particular areas of the country
- skills shortages and recruitment difficulties in engineering can be highly volatile and 'localised', both geographically and in terms of particular skills
- skills shortages in engineering seem to be primarily at the skilled technician and craft level, particularly in the quantity and quality of vocational skills
- the engineering industry has major problems in attracting new entrants to the industry
- many employers respond to recruitment difficulties by attempting to train existing staff to fill posts. The viability and effectiveness of this approach depends on the availability of customised training
- encouragement should be given to training and enterprise councils (TECs) to work with local training providers to promote local customised training provision, which responds quickly to employers' needs

- there is evidence that a major skills deficiency in the UK is the low numbers holding intermediate level vocational qualifications
- the demand for generic skills and personal competencies has increased in recent years. The most commonly cited gap was in computer literacy, although significant numbers of employers said that their employees lacked basic literacy and numeracy skills
- the impracticality of forecasting future skills needs in any detail should be recognised. The most useful labour market information derives from the integration of both the sectoral and local or subregional base
- education and training providers should be able and willing to respond to the demands of individuals and employers for opportunities to acquire skills.

1.8 The Council has established a skills working group (chaired by Llew Aviss, a member of the National Skills Task Force) to review the contribution of FE to work-related learning and to make recommendations to the Council. The group started work in October 1999 and its findings and recommendations should be available in April 2000. This report and the companion report *Construction* have been shared with the group to inform their work and recommendations.

Learning to Succeed

1.9 In June 1999 the DfEE published a white paper entitled *Learning to Succeed*. A new LSC with 47 local learning and skills councils will be established in April 2001.

Research and Analysis

1.10 This report is based on four main activities:

- a review and analysis of literature relating to the engineering industry
- a review of the publications of the National Skills Task Force
- discussions with industry bodies and consultation with an industry-led steering group
- an analysis of the ISR database for the years 1994-95 to 1997-98 and strategic plans.

Further details of the bodies consulted and the research methods used are given on the Council's website. The membership of the steering group is listed at the annex.

Definitions and Constraints

Occupational groupings

1.11 Occupations in the engineering industry are grouped in different ways on different databases. These include:

- standard occupational classification (SOC)
- standard industry classification (SIC)²
- superclass codes.

1.12 The Council's qualification aims database contains details of the superclass codes for qualifications in engineering. Qualifications in the engineering programme area are grouped into over 60 superclass codes. Qualifications have also been grouped at NTO level, which includes a number of superclass groups and individual qualifications.

Time period covered by the research

1.13 The ISR data cover the four-year period from 1994-95 to 1997-98, the last year for which complete data were available during the preparation of this report. Projected data for the period from 1999-2000 to 2000-2001 are derived from college strategic plans.

Student Numbers and Enrolments

1.14 College strategic plans contain details of projected student numbers in the engineering programme area. The ISR data contain details of students' qualification aims. Students can follow more than one qualification aim as part of their programme of study. Thus the number of enrolments is slightly higher than the number of students. This report contains an analysis of students and their qualification aims.

1.15 There are no reliable data on the scale and nature of training outside the college sector. Without these data it is difficult to analyse and comment on the extent to which the demand for training and the trends in skills needs are being met through the range of training available.

1.16 The establishment of the LSC should lead to common data and reporting systems, enabling the new Council to complete an annual skills assessment.

Review of Quality, Retention and Achievement

1.17 The Council's inspection team has produced a separate report on quality, retention, achievement and curriculum issues in engineering provision.

²The Engineering and Marine Training Authority (1998) used the SIC categories 27 to 35 to define the engineering industry.

2.1 This chapter examines the key features of the engineering industry. It is based on a review of the literature, information taken from industry websites and discussions with industry bodies.

The Structure of the Industry

2.2 The Engineering Employers' Federation (EEF) website contains a summary of the principal characteristics of the engineering industry. The UK engineering industry operates at the forefront of high technology markets throughout the world, including aerospace, automotive components, electronics, transport equipment and general machinery and equipment. Half of all UK fixed investment expenditure (£50 billion) is in engineering products. The industry employs over 1.7 million people in the UK (this report provides an analysis of provision in England). UK engineering exports are worth over £72 billion, more than one-third of total UK exports. Total engineering output in the UK amounts to approximately £160 billion, around 8% of total UK GDP. Over 60% of this is exported, around two-thirds to mainland Europe.

2.3 Some 25 NTOs have links with the engineering industry. A number of these were involved in the consultation and development of this report. There are comments on specific industry segments in Chapter 4.

2.4 The NTO for the engineering manufacture sector is the Engineering and Marine Training Authority (EMTA), which represents a significant proportion of the engineering industry. The EMTA uses the SIC categories 27 to 35 to define the scope of the engineering industry.

2.5 The EMTA carried out a comprehensive labour market survey in 1998. Some of the main findings were as follows:

- 3% of engineering companies with more than 250 employees account for 39% of employment in the industry
- 83% of engineering companies employ fewer than 50 people
- around 12,000 engineering businesses employ fewer than five people

- 18% of larger engineering companies are branch operations with headquarters outside the UK
- there is a high level of foreign ownership in the electronics sector
- the majority of engineering employers are well established and have been located at their present site for more than ten years
- there are fewer small firms and more large employers in the engineering industry, compared with national industry averages.

2.6 The EMTA survey also included detailed regional surveys. Some of the main findings were as follows:

- London has more small engineering establishments than other regions
- there is a concentration of automotive and traditional manufacturing companies in the West Midlands
- electronics companies are concentrated in regions such as the South East
- the East Midlands, North East and North West have a higher proportion of recently established companies
- 40% of engineering employees in the West Midlands are aged 45 or over, compared with only 29% in the North West.

2.7 Table 2.1 summarises the numbers of engineering employees by region taken from the EMTA regional reports.

Table 2.1: Regional Distribution of Engineering Employees, 1998

Region	Employees (000s)	% of total
East Midlands	140	9.5
Eastern Region	64	4.5
Greater London	83	5.6
Northern Region	95	6.4
North West	180	12.2
South East	310	21.0
South West	148	9.5
West Midlands	300	20.4
Yorkshire & Humberside	150	10.2
Total	1,470	100

Source: EMTA survey, 1998.

2.8 Table 2.1 includes employees working in organisations that are within the remit of the EMTA. It does not include employees in other NTO areas or those working in an engineering role in other industries.

2.9 The Office for National Statistics (ONS) published data from the Annual Employment Survey showing the regional distribution of employment in manufacturing. This covers a broader range of organisations and employees than the EMTA data. Table 2.2 provides an analysis of the data from 1998.

Table 2.2: Regional Distribution of Employment in Manufacturing, 1998

Region	Total employees (000s)	% manu- facturing	Manu- facturing employees (000s)	% of total
East Midlands	807	35.3	285	11.4
Eastern Region	972	26.1	254	10.1
Greater London	1,682	10.8	182	7.3
Northern Region	443	33.5	148	5.9
North West	1,247	30.4	379	15.2
South East	1,533	20.5	314	12.6
South West	867	25.7	223	8.9
West Midlands	1,083	38.3	415	16.6
Yorkshire & Humberside	922	32.5	300	12.0
Total	9,556	26.1	2,500	100

Source: Office for National Statistics, 1998.

Labour Market Skills Trends

2.10 *Labour Market Skills Trends* draws together information about labour market trends and the demand for and supply of skills in the UK. The latest publication for 1998-99 contains comments relating to the

engineering industry. These comments are summarised in paragraphs 2.11 to 2.18.

2.11 The UK labour market has changed rapidly since the 1970s. One of the most consistent trends, both in the UK and elsewhere, is the decline in the proportion of employment accounted for by the production industries, mainly manufacturing, but also agriculture, mining and utilities, and the corresponding rise in employment in the services sector. This trend is expected to continue.

2.12 One consequence of this trend is that most (but not all) regions where manufacturing accounts for a greater proportion of employment than the national average are expected to experience no growth in the demand for labour over the next ten years. Growth will be concentrated in the South and East of England and there will be little or no growth in the West Midlands and Northern England.

2.13 A second well-established trend is towards more flexible work practices and specifically towards greater use by employers of part-time and temporary staff and subcontractors, who are often self-employed. This trend is also expected to continue.

2.14 Expected changes in the balance between occupations in the economy reflect the trend away from manufacturing and the gradual up-skilling of the economy. So, for example, the number of plant and machine operatives is expected to decline, but the number of people in managerial and administrative, professional, and associated professional and technical occupations is expected to grow by over 1 million between 1997 and 2007. Growth in the demand for staff with specialist IT skills is likely to continue.

2.15 It is, however, necessary to train people even in declining occupations. For example, there is expected to be a need for 350,000 trained workers to become plant and machinery operatives each year between 1997 and 2007 to replace some of the workers leaving that occupation, even though the total number of workers in the occupation is expected to decline. Some will be returning to the occupation and will not need significant training, but many will need training.

2.16 In all industries and occupations, there is a consensus among employers that required skills levels are rising (this is the majority view) or stable. Hardly any employers believe that required skills levels are declining. Engineering employers will increasingly need to recruit people with different and higher-level skills than those required in traditional craft trades.

2.17 Falls in employment between 1981 and 1997 were heavily concentrated in manufacturing. They were particularly severe in metals, minerals and chemicals engineering, but less so in other manufacturing. Greater London lost a particularly large number of manufacturing

jobs. In 1997 there were around 170,000 fewer manufacturing jobs in London than in 1987. Only in the rest of the South East was the loss of manufacturing jobs greater over this period.

2.18 Engineering experienced a temporary slowdown in the rate of job losses as a result of inward investment in electronics and some periods of employment growth in other parts of the sector, such as the motor industry. For example, manufacturing is a declining sector in terms of employment and this corresponds with a fall in the number of plant and machinery operatives between 1997 and 2007. Nonetheless, an average of 350,000 people a year are expected to flow into this occupational group during this period. Although total employment in manufacturing is decreasing, some subsectors in high-tech manufacturing are growing and therefore require people with the right skills.

A new millennium of learning for engineering

2.20 The EEF commissioned a review of current training practices and research into the views of a range of people in the engineering industry on a vision for the sector in the year 2010. The findings of the study were published in January 1997 in *A New Millennium of Learning for Engineering*. Some of the points raised in the report were as follows:

- the engineering sector of 2010 will be leaner and fitter
- the current growth in output and fall in numbers employed will continue
- this will lead to a reduction of 20% to 25% in the numbers of people employed, from 1.8 million to 1.4 million
- the workforce will be more highly skilled with a higher proportion of graduates and technicians and a lower proportion of unskilled and semi-skilled labour
- there will be an increase in specialisation leading to the need for an increase in skills levels
- by 2010 new technologies will have transformed those parts of the sector traditionally considered to be low-tech
- many of the current traditional craft skills will be replaced and supplemented by other higher-level technology-based skills
- it is anticipated that the increase in the female proportion of the workforce will be reflected in the engineering sector at all levels, especially at technician and graduate levels.

The Labour Force

2.21 The EMTA survey found the age distribution in the engineering sector to be:

- 15% between 16 and 25
- 50% between 25 and 45
- 35% over the age of 45.

2.22 This pattern mirrors the age distribution for all employment compared with the data for 1997 from the ONS. There are, however, significant variations with the sector and across regions:

- the motor vehicle sector is more likely to employ young people
- only 28% of the electronics workforce is over the age of 45
- over 43% of transport equipment workers are over the age of 45
- in the North East only 29% of engineering employees are over the age of 45
- in the West Midlands 40% of employees are over the age of 45.

2.23 The estimated proportion of women employed in the engineering industry has increased slightly from 18% in 1993 to 20% in 1998. The increase in employment of women has mainly been in operators and administrative and clerical occupations. Chapter 3 contains an analysis of engineering students indicating that 11% of students are women.

Recruitment difficulties

2.24 The EMTA survey found that half of all employers that were recruiting were experiencing difficulties. These recruitment difficulties were in the automotive, aerospace and metal products sectors. In contrast, employers operating in other transport equipment reported no difficulties. The survey also indicated that firms in all regions were experiencing difficulties in recruiting people for craft jobs.

Skills requirements

2.25 The 1997 DfEE *Skill Needs in Britain* survey found that 69% of employers believed that the skills required of average employees were increasing. The EMTA survey found that only 53% of engineering employers believed that skills requirements were increasing, although the figure rose to 61% for employers with 250 or more employees.

2.26 The EMTA survey found that the South East has a skills shortage that is well below the average. It also found that a shortfall in practical skills was the most significant problem reported by employers in all sectors of the industry. Literacy and numeracy skills were identified as issues in the motor vehicle sector.

2.27 The survey identified a range of skills requirements in relation to new techniques and technologies including:

- computer numerical control
- computer aided design
- computer aided manufacture
- computer aided engineering
- materials requirement planning
- manufacturing resource planning
- statistical process control
- robotics.

2.28 Chapter 4 contains an analysis of provision for computer aided drafting and design in colleges. This has been included to provide a review of the extent to which the FE sector has responded to the challenge of implementing and supporting new technologies.

2.29 The EMTA survey found that there were significant variations in skills requirements for the new technologies throughout the regions, with the highest shortages being reported in Greater London and the lowest in the North East and Yorkshire and Humberside.

3.1 This chapter presents the outcomes of an analysis of student numbers and enrolments at FE colleges in the engineering programme area.¹ It is based on information from college strategic plans and the ISR database.

Background information on the data and more detailed tables can be found on the Council's website.

Engineering Provision in General

3.2 College strategic plans show that, in 1997-98, 365 of the 423 FE colleges in England made some provision in engineering. Of the 4.4 million FE students, 315,000 or

7.2% were on engineering courses. About 80% of these were studying part-time. Overall, in 1997-98, franchise provision in engineering accounted for 20% of Council-funded franchise provision. Franchise provision in the engineering programme area in 1998-99 accounted for 15% of all provision.

Student numbers

3.3 Table 3.1 contains details of actual and projected numbers of students in the engineering programme area between 1995-96 and 2000-2001.

Table 3.1: Number of Students in the Engineering Programme Area², 1995-2001

	1995-96	1996-97	Actual				Projected			
			% change 1997-98		% change 1998-99		% change 1999-2000		% change 2000-01	
Full-time										
East Midlands	4,190	4,652	11	4,075	-12	3,741	-8	3,936	5	4,011
Eastern Region	5,748	5,885	2	5,111	-13	4,458	-13	4,639	4	4,831
Greater London	10,889	10,096	-7	8,993	-11	7,890	-12	8,304	5	8,570
Northern Region	5,818	4,186	-28	4,239	1	4,300	1	4,509	5	4,656
North West	10,031	10,090	1	9,041	-10	8,448	-7	8,703	3	8,896
South East	9,021	8,531	-5	8,316	-3	7,813	-6	8,312	6	8,690
South West	6,494	6,240	-4	5,409	-13	5,160	-5	5,411	5	5,634
West Midlands	8,235	7,285	-12	6,832	-6	5,772	-16	6,165	7	6,462
Yorkshire & Humberside	6,932	5,909	-15	4,992	-16	5,744	15	6,187	8	6,344
Total full-time	67,358	62,874	-7	57,008	-9	53,326	-6	56,166	5	58,094
Part-time										
East Midlands	18,964	22,200	17	27,152	22	22,041	-19	24,196	10	24,871
Eastern Region	21,930	22,028	0	20,140	-9	18,063	-10	20,709	15	21,377
Greater London	27,139	26,608	-2	23,455	-12	18,644	-21	17,323	-7	17,923
Northern Region	17,990	19,020	6	19,576	3	20,828	6	21,942	5	22,209
North West	32,915	33,921	3	34,909	3	35,113	1	34,743	-1	35,492
South East	27,524	35,617	29	33,722	-5	28,919	-14	29,859	3	30,516
South West	25,474	22,456	-12	27,675	23	23,135	-16	24,166	4	24,473
West Midlands	40,041	36,044	-10	39,950	11	37,637	-6	41,755	11	43,418
Yorkshire & Humberside	20,248	25,483	26	26,916	6	24,212	-10	25,129	4	25,766
Total part-time	232,225	243,377	5	253,495	4	228,592	-10	239,822	5	246,045
Overall total	299,583	306,251	2	310,503	1	281,918	-9	295,988	5	304,139

Source: Institutions' strategic plans, July 1995 to July 1998.

¹ Defined for these purposes as Programme Area 4.

² Council-funded students and students in colleges funded from other sources. Data exclude specialist designated colleges.

3.4 During the four-year period from 1995-96 to 1998-99 the actual number of students on engineering courses decreased by 6%, compared with an increase of 14% in the overall number of students. There was a 20% decrease in the number of full-time students on engineering courses, compared with a 6% decrease in the overall number of full-time students. There was also a 1.6% decrease in the number of part-time students on engineering courses, compared with an 18% increase in the overall number of part-time students.

3.5 The data on student numbers provided through college strategic plans for 1998-99, compared with the 1997-98 strategic plan data, show that there was a 6% decrease in the number of full-time students, a 10% decrease in the number of part-time students and a 9% decrease in the overall number of students.

3.6 This significant decrease in student numbers in the engineering programme area does not imply a major decline in provision. During 1998-99 a number of qualifications were reclassified from engineering to other programme areas, leading to the transfer of over 8,000 enrolments to other programme areas.

3.7 An analysis of student numbers by college in the engineering programme area shows increases and decreases in student numbers. In most cases, where there has been a decrease it is accounted for by:

- reclassification of qualifications to other programme areas
- transfer of provision to the higher education sector, which is not included in the strategic planning numbers
- reclassification of franchise activity
- the underlying local economic climate.

3.8 The strategic planning information for 1998-99 shows a 5% projected growth in student numbers in the engineering programme area over the next two years.

Longer-term trends

3.9 Data were collected and analysed in different ways before the incorporation of colleges. Table 3.2 contains details of student numbers in the years leading up to and following incorporation in 1993.

Table 3.2: Number of Full-time and Part-time Engineering Students up to and after Incorporation, 1998-99

Year	Full-time	Part-time	Total
1988-89	28,172	190,250	218,422
1989-90	29,299	194,625	223,924
1990-91	29,272	187,300	216,572
1991-92	37,479	185,003	214,275
1992-93	43,258	158,894	202,152
1993-94	50,232	149,673	199,905
1994-95	57,900	172,200	230,100
1995-96	67,358	232,225	299,583
1996-97	62,874	243,377	306,251
1997-98	57,008	253,495	310,503
1998-99	53,326	228,592	281,918

Source: DfEE statistics and college strategic plans, 1995-99.

3.10 The data collection methods have changed since incorporation. Previously, most returns were based on manual data collection processes. The data provided by colleges since incorporation are based on audited student information systems data. The underlying trend over the 11-year period is a growth in both full-time and part-time student numbers.

Provision by region

3.11 Table 3.3 shows the distribution of students across the nine Council regions.

Table 3.3: Regional Distribution of Students³, 1998-99

	College provision in programme areas	College provision in engineering programme area	% of region's provision in engineering	% of national engineering provision	% of national provision in all programme areas
Full-time					
East Midlands	54,694	3,741	7	7	7
Eastern Region	72,186	4,458	6	8	9
Greater London	121,900	7,890	6	15	16
Northern Region	41,560	4,300	10	8	5
North West	121,513	8,448	7	16	16
South East	115,573	7,813	7	15	15
South West	71,746	5,160	7	10	9
West Midlands	98,025	5,772	6	11	13
Yorkshire & Humberside	78,983	5,744	7	11	10
Total full-time	776,180	53,326		100	100
Average			7		
Part-time					
East Midlands	323,205	22,041	7	10	9
Eastern Region	307,238	18,063	6	8	8
Greater London	406,258	18,644	5	8	11
Northern Region	226,686	20,828	9	9	6
North West	608,489	35,113	6	15	17
South East	428,970	28,919	7	13	12
South West	388,932	23,135	6	10	11
West Midlands	516,948	37,637	7	16	14
Yorkshire & Humberside	412,911	24,212	6	11	11
Total part-time	3,619,637	228,592		100	100
Average			6		
Overall total	4,395,817	281,918	5	100	100

Source: Institutions' strategic plans, July 1999.

³ Data exclude specialist designated colleges.

3.12 The Northern and West Midlands regions have seen significant decreases in the number of full-time students on engineering courses, compared with the North West and Eastern regions, which have seen a small increase, and the East Midlands region, which has remained fairly static. This information needs to be qualified and interpreted in the following context:

- colleges make provision, particularly part-time provision, in other regions
- there are regional variations in the characteristics of the engineering industry.

Enrolments

3.13 The ISR database records details of enrolments on qualifications. An analysis of the database shows that in 1997-98 there were 376,279 enrolments in the engineering programme area, compared with a total of 6,739,624 enrolments in all programme areas.

Enrolments in the engineering programme area represent about 6% of the total number of enrolments. During the period from 1994-95 to 1997-98 the number of enrolments in the engineering programme area increased by 41%, compared with an increase of 59% for all programme areas.

Table 3.4: Regional Distribution of Full-time Engineering Provision, 1998

Region	% of full-time provision
East Midlands	7
Eastern Region	9
Greater London	16
Northern Region	5
North West	16
South East	15
South West	9
West Midlands	13
Yorkshire and Humberside	10
Total	100

Source: Institutions' strategic plans, July 1999

Enrolments by region

3.14 Table 3.4 provides a comparison of the percentage of provision as indicated through the strategic planning information.

Enrolments by college

3.15 The ISR data show that a large proportion of engineering provision is made in 365 out of 423 FE colleges in England. There were more than 50 enrolments in the engineering programme area in more than 314 colleges.

3.16 An analysis of the number of enrolments by college in descending order for 1997-98 shows that:

- 15 colleges were responsible for 20% of total enrolments
- 62 colleges were responsible for 50% of total enrolments
- 150 colleges were responsible for 80% of total enrolments.

3.17 A list of colleges with more than 2,000 enrolments in 1997-98 is available on the Council's website. In some cases colleges are making significant part-time provision through franchise arrangements. This may account for the position of colleges in the table, which is based on total enrolments.

3.18 The analysis indicates that engineering provision is widely available. There may be opportunities through local learning partnerships and the local learning and skills councils to review arrangements to collaborate and rationalise provision in engineering.

Gender, age and ethnicity

3.19 Table 3.5 shows the gender, age and ethnicity of people undertaking engineering courses. Some of the key points are as follows:

- 89% of engineering students are male, compared with 46% for all student in FE colleges
- 52% of students are aged 25 or over, compared with 53% for all students in FE colleges
- 18% of engineering students are from non-white ethnic minority groups, compared with 23% for all students in FE colleges.

Non-Council-funded provision and collaborative provision

3.20 Some of the courses and qualifications provided by FE colleges do not attract funding from the FEFC. These include courses funded by employers and employees, some HE programmes and TEC-funded programmes in FE colleges. Overall, in 1997-98, 83% of FE students were on Council-funded courses. A slightly lower percentage (80%) of engineering students were on Council-funded courses.

3.21 Many colleges collaborate with other organisations to provide courses. Franchised provision in the engineering programme area accounted for 20% of all provision. Details of franchised provision are available on the Council's website.

Detailed Analysis of ISR Data

3.22 There are some 889⁴ engineering-related qualifications on the ISR database. Further details of these qualifications are available on the Council's website. Qualifications may be analysed in terms of:

- the level of qualification
- the duration of the qualification⁵
- the number of enrolments
- the notional NVQ level.

Notional NVQ level

3.23 Table 3.6 gives details of enrolments in the engineering programme area over the period 1994-95 to 1997-98.

3.24 The analysis indicates that during the period from 1994 to 1998 there has been growth of 83% in level 1 enrolments, 45% in level 2 enrolments and 5% in level 3 enrolments, and a decrease of 16% in level 4 enrolments. The percentage of enrolments by notional NVQ level is shown in Table 3.7.

⁴Total number of qualifications available compared with those that have been used.

⁵Short duration is defined as fewer than 60 guided learning hours, medium is defined as between 60 and 119 guided learning hours and long duration is defined as over 120 guided learning hours.

Table 3.5: Number and Proportion of Students on Engineering Courses, by Age, Gender and Ethnicity, 1997-98

	Female No. of students	%	Male No. of students	%	Total No. of students	%
Age						
Under 16	164	10	1,548	90	1,712	1
16-18	5,063	6	73,492	94	78,555	26
19-20	1,874	8	22,293	92	24,167	8
21-24	4,557	13	31,775	87	36,332	12
25-39	12,996	13	84,254	87	97,250	32
40-59	7,725	13	49,674	87	57,399	19
60 and over	594	15	3,458	85	4,052	1
Not known	566	14	3,601	86	4,167	1
Total	33,539	11	270,095	89	303,634	100
Ethnicity						
Bangladeshi	67	6	984	93.6	1,051	0.3
Black African	412	14	2,619	86.4	3,031	1
Black Caribbean	605	15	3,423	85	4,028	1.3
Other Black	190	13	1,233	86.6	1,423	0.5
Chinese	126	20	495	79.7	621	0.2
Indian	651	14	4,166	86.5	4,817	1.6
Pakistani	650	16	3,540	84.5	4,190	1.4
White	26,512	11	221,455	89.3	247,967	81.7
Other Asian	223	13	1,506	87.1	1,729	0.6
Others	507	15	2,910	85.2	3,417	1.1
Not known	3,596	11	27,764	88.5	31,360	10.3
Total	33,539	11	270,095	89	303,634	100

Source: ISR database, 1998.

Figures may not sum to 100 owing to rounding.

Table 3.6: Engineering Enrolments by Notional NVQ level, 1994-98

NVQ level	1994-95	1995-96	1996-97	1997-98
1	48,195	62,035	76,782	88,361
2	85,944	94,674	114,570	124,239
3	66,759	67,377	69,012	70,241
H	24,637	21,360	20,080	20,646
X	40,985	72,343	59,547	72,792
Total	266,520	317,789	339,991	376,279

Source: ISR database, 1994-95 to 1997-98.

Popular qualifications

3.25 The ten most popular long-duration qualifications in 1997-98 are shown in Table 3.8.

Table 3.7: Percentage of Engineering Enrolments by Notional NVQ Level, 1994-98

NVQ level	1994-95	1995-96	1996-97	1997-98
1	18	20	23	23
2	32	30	34	33
3	25	21	20	19
H	9	7	6	5
X	15	23	18	19
Total	100	100	100	100

Source: ISR database, 1994-95 to 1997-98.

Figures may not sum to 100 owing to rounding.

Table 3.8: Ten Most Popular Long-duration Qualifications in Engineering, 1997-98

Awarding Body	Qualification Title	Notional NVQ Level	NVQ Width	Total	Engineering	Short
				Enrol- ments	Enrol- ments	Duration
				No.	%	%
CG	NVQ in Vehicle Mechanical and Electronic Systems – Unit Replacement	2	100	6,095	1.62	1
BTEC	National Certificate in Engineering (Electrical/Electronic)	3	100	6,125	1.63	3
EMTA	NVQ in Engineering Manufacture (Foundation)	2	100	6,382	1.7	3
CG	C and G 2360 in Electrical Installation Part I; Competences	1	100	6,149	1.63	5
BTEC	GNVQ in Advanced Engineering	3	100	3,992	1.06	0
BTEC	National Certificate in Engineering (Mechanical/Manufacture)	3	100	4,063	1.08	1
BTEC	National Diploma in Engineering	3	100	3,615	0.96	0
BTEC	National Certificate in Engineering	3	100	3,587	0.95	3
CG	C and G 2280 in Mechanical Production Competences Part 2	2	100	3,501	0.93	2
CG	C and G 3830 in Repair and Servicing of Road Vehicles Level I	1	100	3,275	0.87	4
J9117	C and G 2240 in Electronics Servicing Part I; Joint Certificate with EEB	1	100	3,001	0.8	3

Analysis by Superclass Codes

3.26 The ISR Superclass codes enable the enrolment data to be grouped in broad occupational areas. Table 3.9 shows the distribution of enrolments across superclass groups with more than 10,000 enrolments.

Table 3.9: Distribution of Enrolments Across Superclass Groups⁶, 1997-98

Superclass group	Description	Total enrolments	% of total engineering enrolments
XS	Vehicle maintenance/repair	36,062	9.58
TH	Building services	34,997	9.3
ZF	Marine transport	33,931	9.02
XA	Engineering/technology (general)	30,324	8.06
VF	Industrial design/research & development	20,115	5.35
WA	Manufacturing (general)	18,182	4.83
XJ	Electrical engineering	17,359	4.61
ZD	Freight handling	17,166	4.56
XH	Mechanical engineering	13,709	3.64
XN	Electrical/electronic servicing	10,184	2.71
Unknown	Unknown	59,204	15.73

Source: ISR database, July 1998.

⁶ Groups with more than 10,000 enrolments.

Short Enrol-ments		Medium Enrol-ments		Long Enrol-ments		Unknown Enrol-ments		Council Funded Enrol-ments		Non-Council Funded Enrol-ments		Franchised Enrol-ments		Non-Franchised Enrol-ments	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
60	5	303	93	5,639	2	93	57	3,456	43	2,639	0	0	100		
189	5	292	91	5,568	1	76	76	4,682	24	1,443	0	0	100		
169	13	854	84	5,330	0	29	67	4,297	33	2,085	3	176	97		
304	12	752	81	4,989	2	104	81	4,972	19	1,177	1	84	99		
3	0	3	99	3,967	0	19	93	3,729	7	263	1	29	99		
54	4	153	94	3,824	1	32	67	2,721	33	1,342	0	0	100		
11	1	26	99	3,570	0	8	92	3,341	8	274	0	0	100		
107	3	96	93	3,332	1	52	74	2,654	26	933	0	1	100		
61	5	167	93	3,258	0	15	62	2,154	38	1,347	0	0	100		
118	11	346	85	2,781	1	30	87	2,844	13	431	0	0	100		
94	6	188	90	2,702	1	17	93	2,778	7	223	1	30	99		

Role and Aims of National Training Organisations

4.1 National training organisations (NTOs) are employer owned and funded bodies dedicated to meeting the current and future skills needs of their employment sectors. Most NTOs cover a particular industry, commercial sector or public service. There are a few all-sector NTOs that cover broad occupational groups such as management and administration.

4.2 The general role of NTOs is to:

- act as a focal point for all education and training matters for the sector that they represent
- help to raise the skills levels of people who are involved in the sector
- represent the needs of the sector to government and other bodies.

4.3 NTOs engage in a range of activities including:

- developing and maintaining occupational standards
- promoting and encouraging the use of standards
- developing and promoting modern apprenticeships for the sector
- providing training information and advice
- establishing a map of the sector
- reviewing and assessing future skills and training requirements.

Learning to Succeed

4.4 The government's white paper *Learning to Succeed* (June 1999) defined a pivotal role for NTOs in ensuring that education and training deliver the skills needed by employers. The white paper contains a number of references to NTOs and their new role in addressing the skills agenda.

National Training Organisations in the Engineering Sector

4.5 There are 25 NTOs that have some link to the engineering sector; 16 of which relate directly to key areas of provision.

4.6 The EMTA covers a significant proportion of all engineering activity. The EMTA and two other NTOs were included in the steering group that was consulted on the specification and development of this report.

Analysis of Provision at NTO Level

4.7 The National Skills Task Force identified that skills need to be addressed at both local and sector levels. NTO remits provide a framework for analysis and interpretation of provision at sector level.

4.8 A number of NTOs were invited to identify superclass groups and individual qualifications that were within their areas of activity. The information was used to provide an analysis of college provision at NTO level.

4.9 This chapter contains an analysis of provision for two NTOs, representing electrotechnical training and motor industry training. An analysis of provision for other NTOs and of segments of the EMTA's remit will be presented to the NTOs and published on the Council's website.

4.10 The areas to be analysed are:

- mechanical
- engineering maintenance
- marine engineering
- fabrication and welding
- chemical/materials
- engineering technology
- manufacturing general
- steel industry
- road haulage.

4.11 The content and presentation of the analysis will be discussed and reviewed with the NTOs and used to develop an approach that can be implemented consistently across the full range of NTOs.

Specification of the Data Analysis

4.12 The analysis includes a list of all qualifications taken from the qualifications database in the superclass areas identified by the NTO. There is also a list of qualifications and enrolments for latest-year ISR data for all

qualifications identified by the NTO, including additional qualifications that may be in other superclass areas.

4.13 The ISR data are analysed by:

- level of qualification
- duration of course
- age of student
- region.

4.14 Enrolments for as many ISR years as available are analysed to indicate trends in:

- total number of enrolments
- level of qualifications
- duration of courses
- regional distribution of enrolments.

National Electrotechnical Training

4.15 National Electrotechnical Training (NET) is the recognised NTO for the electrotechnical sector employing people in the installation, assembling and maintenance of electrical systems and equipment. The projects undertaken by the sector range from small domestic installation to large industrial and commercial complexes.

4.16 Qualifications within the remit of the NET are included in programme area 4 (engineering) and programme area 3 (construction). The NET carried out skills and labour market surveys in 1997 and 1999. Some of the findings of the most recent survey, entitled *Report on a Skills & Labour Market Survey of the Electrotechnical Industry, 1999*, are discussed below.

Labour market

4.17 The industry employs around 350,000 people, of whom some 225,000 work in the electrical contracting sector. The rest are involved in electrical and electronic competences in other sectors of the industry, including local authorities, large public-sector organisations such as health authorities, large retail organisations and numerous manufacturing companies of all types.

4.18 As well as direct employment, there is a strong tradition of using subcontracted labour. When the research was carried out more than half the participants reported growth in the workforce in the previous year and one-third were predicting growth for 1999.

Recruitment

4.19 There are many reports of difficulties in recruitment. These are most severe in the case of approved electricians because of the comparatively large numbers required. Significant difficulties are also experienced in recruiting managers, technicians and supervisors.

Skills shortages

4.20 There are widely reported shortages of approved electricians and technicians. Technician and manager posts are often difficult to fill because of the inadequate qualifications of applicants. Many respondents report that applicants for apprenticeships lack key skills, such as written and verbal communication, numeracy and problem solving. Although the numbers involved are small, there is competition to attract good engineers.

Skills gaps

4.21 At the management level, respondents reported that a lack of information technology, marketing, financial and general management skills holds firms back. They also noted a lack of supervisory skills.

4.22 In technical areas, the gaps are in knowledge rather than practical skills. These include health and safety and knowledge of legislation. The attitude of employees is often criticised, and, as in the case of skills gaps, employers claim this has a substantial effect on business performance.

4.23 Information technology skills are identified as a major area for development in all categories of employees.

Qualifications

4.24 An estimated 71% of the workforce have some form of relevant qualification, although only 4% are qualified at Level 4 or 5. The most used qualification is City and Guilds Part 2, held by 27% of the workforce.

4.25 More than 15% of the workforce represented in the survey are following modern apprenticeships and working towards National Vocational Qualifications (NVQs) or Scottish Vocational Qualifications (SVQs).

Training

4.26 Half the firms participating in the survey could be described as training firms because they had recently provided employees with some training, or because they had some knowledge of modern training initiatives. Among the staff (including apprentices) covered by the survey, 44% had received some training in the previous year.

Training initiatives

4.27 Only half the survey participants felt they were reasonably well informed about NVQs (England and Wales) and SVQs (Scotland). Slightly more felt adequately informed about modern apprenticeships, but there was some evidence that not all employers are able to differentiate between the old apprenticeship and the modern apprenticeship.

4.28 Other initiatives such as Investors in People seem to be having little impact, and initiatives to increase the use of National Occupational Standards outside NVQs/SVQs are, as yet, new and therefore untried.

The future of the industry

4.29 The research shows that 15% of employees are modern apprentices, following a traineeship that can last for three to four years. The numbers required to replace leavers and to provide for growth appear to be in the region of 15% per year, giving an annual shortfall of around 10%, equivalent to 35,000 people. It is clear that this shortfall cannot be sustained for many years without damaging or changing the industry beyond recognition.

4.30 At a higher level there are signs of persistent shortages of staff capable of performing well in 'promoted posts'. This indicates a strong need to promote further learning to well-qualified and competent electricians, so that they may be properly qualified to meet the needs of the industry.

Analysis of provision

4.31 A detailed analysis of provision is available on the Council's website. The key findings of the analysis were as follows:

- enrolments decreased from 38,501 in 1995-96 to 36,895 in 1997-98
- the reduction was greatest for long qualifications (defined as more than 120 guided learning hours)
- the largest number of enrolments occurred in the North West and Greater London regions, which together accounted for nearly 40% of all enrolments
- the smallest number of enrolments was in the Northern region
- only 2% of students were female, compared with the average for engineering of 11% and the average for all programme areas of 54%
- the most popular qualifications were the City and Guilds in Electrical Installation Part 1 Competences, which accounted for 17% of all enrolments, and the BTEC National Certificate in Engineering (Electrical/Electronic), which also accounted for around 17% of all enrolments
- six qualifications accounted for 70% of all enrolments
- electrotechnical qualifications are widely available, with more than 110 colleges having more than 120 enrolments each.

Table 4.1: Electrotechnical Enrolments By Qualification Level, 1995–98

Notional level	1995-96	1996-97	1997-98
1	8,757	8,111	7,051
2	7,486	6,946	11,785
3	11,116	9,668	9,023
H	4,868	3,805	3,427
X	6,274	5,767	5,609
Total	38,501	34,297	36,895

Source: ISR database, 1997-98.

Table 4.2: Regional Distribution of Electrotechnical Enrolments, 1995–98

Region	1995-96	1996-97	1997-98
East Midlands	2,943	2,885	3,847
Eastern Region	3,693	3,339	3,399
Greater London	5,851	5,191	5,076
Northern Region	2,488	2,193	2,439
North West	6,133	5,329	5,614
South East	5,755	4,553	5,024
South West	3,114	3,117	3,474
West Midlands	5,280	4,756	4,803
Yorkshire & Humberside	3,244	2,934	3,219
Total	38,501	34,297	36,895

Source: ISR database, 1997-98.

Table 4.3: Electrotechnical Enrolments by Length of Course, 1995–98

Course length	1995-96	1996-97	1997-98
Short (9–59 hours)	8,647	8,493	13,239
Medium (60–119 hours)	2,174	2,451	2,474
Long (120+ hours)	26,974	22,859	20,364
Unknown	706	494	818
Total	38,501	34,297	36,895

Source: ISR database, 1997-98.

Motor Industry Training Council

4.32 The Motor Industry Training Council (MITC) represents the retail motor industry, including the areas of motor vehicle retailers:

- sale, maintenance and repair of motor vehicles
- sale of motor vehicle parts and accessories
- sale, maintenance and repair of motorcycles
- retail sale of automotive fuel.

4.33 The latest survey carried out by the MITC for which data are available took place in 1998. Some key findings of this survey are discussed below.

Labour market

4.34 In the UK, the industry encompasses some 20,000 companies, operating 70,000 business units and employing almost 600,000 staff. It employs approximately 3% of the workforce. Over half of the companies in the industry employ fewer than ten people, and only 5% of companies employ more than 500 people. More than 80% of the workforce are male, although the majority of employees in the fuel retailing sector are female.

Skills shortages

4.35 The 1998 report concentrated on four regions (Highlands and Islands, North Wales, West London and West Yorkshire) and two specific subsectors: franchised dealers and body repair. National statistics and evidence were collected from significant organisations, such as trade associations.

4.36 The research highlighted an urgent and serious shortage of skilled people for the body-building and repairs subsector. It also revealed shortages of good-quality customer-facing staff throughout the industry and of mechanics and technicians in the service and repairs sector. Employers frequently mentioned the lack of key and core skills among school leavers. They were also concerned about the low status of the industry as perceived by school leavers.

Analysis of provision

4.37 A detailed analysis of provision is available on the Council's website. The key findings of the analysis were as follows:

- enrolments increased from 40,365 in 1995-96 to 43,081 in 1997-98
- there was a 31% increase in level 1 qualifications and a 6% increase in level 3 qualifications
- there was a 100% increase in enrolments on short qualifications and a 2% increase in enrolments on long qualifications
- the largest number of enrolments occur in the West Midlands and the South East regions, which together account for nearly 30% of all enrolments
- the smallest number of enrolments was in the Northern region
- only 4% of students were female, compared with the average for engineering of 11% and the average for all programme areas of 54%

- the most popular qualifications were the NVQ in Vehicle Mechanical and Electronic Systems – Unit Replacement, which accounted for 14% of all enrolments, and the City and Guilds 3830 in Repair and Servicing of Road Vehicles Level 1, which accounted for around 8% of all enrolments
- nine qualifications accounted for 90% of all enrolments
- motor industry qualifications are widely available, with over 100 colleges having more than 150 enrolments each.

Table 4.4: Motor Vehicle Enrolments by Qualification Level, 1995–98

Notional level	1995-96	1996-97	1997-98
1	8,315	9,337	10,943
2	17,243	17,246	15,989
3	13,269	13,574	14,026
H	1,417	1,358	1,198
X	121	906	925
Total	40,365	42,421	43,081

Source: ISR database, 1997-98.

Table 4.5: Regional Distribution of Motor Vehicle Enrolments, 1995–98

Region	1995-96	1996-97	1997-98
East Midlands	2,939	3,028	3,328
Eastern Region	4,957	4,999	5,247
Greater London	5,487	5,507	5,085
Northern Region	1,937	1,695	1,731
North West	5,057	5,241	5,517
South East	6,251	6,330	6,081
South West	4,247	5,009	4,936
West Midlands	5,328	6,250	7,200
Yorkshire & Humberside	4,162	4,362	3,956
Total	40,365	42,421	43,081

Source: ISR database, 1997-98.

Table 4.6: Motor Vehicle Enrolments by Length of Course, 1995–98

Course length	1995-96	1996-97	1997-98
Short (9–59 hours)	1,247	1,951	2,491
Medium (60–119 hours)	3,957	4,444	4,472
Long (120+ hours)	34,883	35,351	35,483
Unknown	278	675	635
Total	40,365	42,421	43,081

Source: ISR database, 1997-98.

5.1 This chapter analyses enrolments on computer aided drafting and design courses. The analysis is intended to provide a review of the response of the FE sector to the demand for new technology-based skills.

Background

5.2 AutoCAD is a computer aided design software package that is used in a wide range of industries. It is established as the market leader for personal computer-based applications. There are over 120,000 software licences for AutoCAD in the UK, around 30,000 licences for use in further and higher education and approximately 12,000 student licences.

5.3 Autodesk¹ supports accredited training centres throughout England, including FE colleges and private training providers. It has developed a number of training courses that are available throughout the world. These cater for over 1 million students per year, of which over 50,000 are based in the UK. Courses are available at foundation, basic and advanced levels using standard training materials and leading to an Autodesk certificate.

5.4 Autodesk has liaised with City and Guilds to develop a range of qualifications based on AutoCAD and is currently in discussion with EDEXCEL to develop new qualifications. There are frequent upgrades to the software package and inherent problems in maintaining up-to-date specifications for the qualifications framework and assessment. Autodesk is currently developing a range of focused products for applications in sectors such as engineering, architecture and land development.

5.5 The EMTA carried out a survey in 1998² to provide an insight into labour market and skills and training needs issues in engineering manufacturing. The survey identified types of technology techniques including computer aided design and found that:

- AutoCAD is one of the more commonly used technologies, although the incidence of use increases dramatically with the size of the firm
- almost 40% of firms with fewer than 50 employees did not use the new technologies, compared with only 2% of large firms
- firms that had set up recently were more likely to use the new technologies
- 20% of firms reported a skills shortage in AutoCAD, although this figure was significantly higher for firms with fewer than 50 employees
- firms in London reported the highest skills shortages, although this may be linked to the size of firms in London
- 75% of employers stated that they would seek to train existing staff, but only 7% stated that they would recruit new staff to meet the new skills requirements.

Qualifications

5.6 Table 5.1 lists the qualifications included within the scope of this study. The analysis covers the three-year period from 1995-96 to 1997-98.

Table 5.1: Qualifications Included Within the Scope of the Study

Code	Awarding body	Title	Level
00111511	CG	C and G 4351 in Computer Aided Drafting and Design Using AutoCAD	2
00111512	CG	C and G 4351 in Advanced CAD and System Management Using AutoCAD	2
00111513	CG	C and G 4351 in Three-dimensional Design Using AutoCAD	2
00111514	CG	C and G 4351 in AutoCAD Customisation and System Management	2
00111516	CG	C and G 4351 in Using AutoCAD AEC in the Built Environment	2
00119312	NCFE	Applications of AutoPLANT CAD Software	2
00221019	NCFE	Advanced AutoCAD	3
00221978	NCFE	Introduction to AutoCAD	2
00222532	NCFE	Introduction to AutoCAD	1

Source: FEFC qualifications database.

¹ Autodesk is the name of the software company and AutoCAD is its leading CAD software package.

² EMTA, *Labour Market Survey of the Engineering Industry in Britain*, 1998.

Enrolments on AutoCAD courses

5.7 During the three-year period of the study enrolments on the qualifications have remained comparatively stable at around 15,000 per year. Table 5.2 shows the number of enrolments over the three-year period.

Table 5.2: Students on AutoCAD Provision, Council- and non-Council-funded, 1995–98

Year	No. of students
1995-96	15,242
1996-97	16,246
1997-98	16,074

Source: ISR 1995-96, 1996-97, 1997-98.

5.8 An analysis of enrolments from 1997-98 indicates that:

- over 2,000 enrolments were for students in the 16–18 age group, who may be enrolled on AutoCAD as part of a full-time programme of study
- there were over 10,000 enrolments for students in the 25–59 age group.

5.9 Table 5.3 shows the number of enrolments on AutoCAD courses by age group.

Table 5.3: Enrolments by Age Group, 1997-98

Age group	Funded	Non-funded	Total in age group
Under 16	8	18	26
16-18	2,315	334	2,649
19-20	763	138	901
21-24	1,687	85	1,772
25-59	10,011	265	10,276
60 and over	297	5	302
Not known	139	9	148
Total	15,220	854	16,074

Source: ISR 1997-98.

Regional distribution

5.10 The ISR database contains details of the location of students. This has been analysed on a regional basis.

5.11 The EMTA survey included regional data on the number of employees. These details have been included in the analysis. Table 5.4 gives details of employees and enrolments by region.

Table 5.4: Regional Distribution of Engineering Employees and Enrolments, 1997-98

Region	Employees (000s)	AutoCAD students
East Midlands	140	1,587
Eastern Region	64	1,579
Greater London	83	2,003
Northern Region	95	1,351
North West	180	1,850
South East	310	2,028
South West	148	1,683
West Midlands	300	1,999
Yorkshire & Humberside	150	1,994
Total	1,470	16,074

Source: ISR 1997-98.

Retention and achievement

5.12 Retention rates for the City and Guilds 4351 qualification have remained at around 83% over the three-year period from 1995-96 to 1997-98. Achievement rates are around 60% for those who complete the course of study, which represents about 50% for those who enrol on the qualification. It is difficult to reconcile precisely the data from City and Guilds on registration and certificates awarded. An analysis of the available data suggests that:

- FE is the major provider of City and Guilds qualifications
- about 80% of students who complete the course register with City and Guilds
- about 87% of students who register achieve the qualification.

Sources of funding

5.13 An analysis of the fee information for 1997-98 indicates that less than 20% of employers were recorded as paying the fee for the programme of study. Over 3,000 students were in receipt of fee remission, although this figure would include all of the 16-18 full-time students who are eligible for fee remission. Table 5.5 analyses sources of funding for enrolments in 1997-98.

Table 5.5: Sources of Funding, 1997-98

Fee information	No. of students
Released from employment, employer pays fee	516
Release from employment, fee remission	630
Released from employment, employer does not pay fee	1,324
Not released from employment, employer pays fee	2,195
Not released, pays own fee	7,986
Not released, fee remission	3,423
Total	16,074

Source: ISR 1997-98.

Public funding for AutoCAD provision

5.14 The ISR database does not contain details of funding made available to colleges for individual student enrolments. An estimate of the level of funding suggests that around £5 million is allocated to colleges for AutoCAD enrolments. This figure does not include fees that colleges charge students.

Analysis of provision

5.15 The analysis indicates that colleges are making a significant contribution to the development of computer aided drafting skills and in particular that:

- the level of enrolments has remained at a consistent level over the last three years
- there is a regional distribution of provision that is similar to the distribution of employment in engineering
- the majority of students are in the 25-59 age group, indicating that the qualification is meeting a skills updating need
- the majority of students are not released from employment and are paying their own fees
- completion rates are good, although the comparison with City and Guilds data suggests that many students who complete the course do not enter for the qualification
- a large percentage of students who register for the qualification achieve the qualification.

Student Numbers

6.1 Evidence from the strategic planning returns from colleges indicates that full-time student numbers continue to decrease. The level of the decline is difficult to determine given the changes in the qualifications in this programme area.

6.2 Factors that have contributed to a decrease in full-time enrolments include:

- an increase in the numbers of trainees following the modern apprenticeship and national traineeship routes
- the impact of a decline in engineering employment
- difficulties in attracting new students into the engineering area.

6.3 The National Skills Task Force identified potential difficulties in attracting new entrants to the industry including:

- poor perceptions of the industry
- lower remuneration than in other sectors
- perceptions of insecurity of employment in engineering
- perceptions of poor training records, particularly in small and medium-sized enterprises (SMEs).¹

6.4 The EEF steering group representative advised that a career in engineering suffers from a number of common misconceptions, particularly that it is low skilled and poorly paid. In reality, the sector includes innovative and world-leading companies, both large and small, which offer challenging and financially beneficial careers. A number of recent surveys have confirmed this view.

6.5 The new LSC will have access to a fuller and more consistent range of data on engineering provision. Local learning and skills councils and lifelong learning partnerships will be in a stronger position to monitor provision in the local areas.

Recommendation 1: local learning partnerships should include an analysis of local skills needs in engineering as part of their medium-term work plans and in preparation for working with the local learning and skills councils.

Superclass Groups

6.6 There is some evidence to suggest that as well as changes in the numbers of students enrolled at colleges, there are also underlying changes in the nature of provision in terms of enrolments in superclass groups. It is not possible to quantify these changes as only a limited number of qualifications were assigned to superclass groups in the 1995-96 ISR data sets.

6.7 The skills needs analysis for engineering identifies the demand for a new and broader range of skills for new entrants and existing employees.

Recommendation 2: the LSC should consider how provision can be planned and developed in a more consistent and coherent way to support the underlying changes in the nature of local, regional and national demand.

Colleges

6.8 There are still a large number of colleges making engineering provision, some with a small number of enrolments. The rationalisation and collaboration funds provide an opportunity to review the patterns of provision and to identify opportunities to develop local area frameworks for entry and higher-level qualifications, including the development of subregional centres of excellence.

Recommendation 3: colleges in local learning partnerships should consider using the rationalisation funds to review local patterns of provision and identify opportunities to both broaden and focus provision in the area.

¹ DfEE, *Towards a National Skills Agenda*, First Report of the National Skills Task Force, September 1998.

National Training Organisations

6.9 The National Skills Task Force report identified skills issues at both local and sector levels.

6.10 This report includes an analysis of provision based on NTO areas of responsibility in an attempt to focus on specific sectors in the industry.

Recommendation 4: NTOs and major college providers should work more closely together to identify and address specific sector issues.

Recommendation 5: the Council should continue to develop the analysis of data at NTO level to support and encourage the debate on skills and provision issues at the sector level.

Specific Qualifications

6.11 The analysis of AutoCAD provision illustrates the ability of the sector to respond to a specific skills demand and to make public provision for students and companies that may not have to access private provision.

6.12 The report highlights a number of issues that should be considered by the Council's skills working group.

Recommendation 6: the Council should consider a broader analysis of the provision for computer aided drafting and design to include information on the barriers to access and the outcomes for students and their employers of training and skills development.

Annex

Membership of the Steering Group

Sue Peacock, Head of External Affairs and Policy,
Engineering and Marine Training Authority (EMTA)

Sheila McGregor, Director, Motor Industry Training
Council (MITC)

Ann Bailey, Head of Education and Training Affairs,
Engineering Employers' Federation (EEF)

Alan Gray, Havering College

Neil Cruickshank, National Electrotechnical Training

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