



Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2009

CONSTRUCTION STUDIES

ORDINARY LEVEL CHIEF EXAMINER'S REPORT

HIGHER LEVEL CHIEF EXAMINER'S REPORT

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Construction Studies Examination 2009

1. General Introduction

1.1 The Syllabus

The current syllabus in Construction Studies was introduced in 1984, 25 years ago, and was examined for the first time in 1986. The syllabus is examined at two levels – Ordinary Level and Higher Level. A revised syllabus, Architectural Technology, awaits implementation and is to replace the current syllabus in Construction Studies.

Note:

This report should be read in conjunction with the examination paper(s) and the published marking scheme(s). These are available on the State Examination Commission's website www.examinations.ie

1.2 The Examination

The current examination, at both Ordinary Level and Higher Level, comprises three components:

- Written examination
- Coursework – artefact and design folio
- Practical skills test.

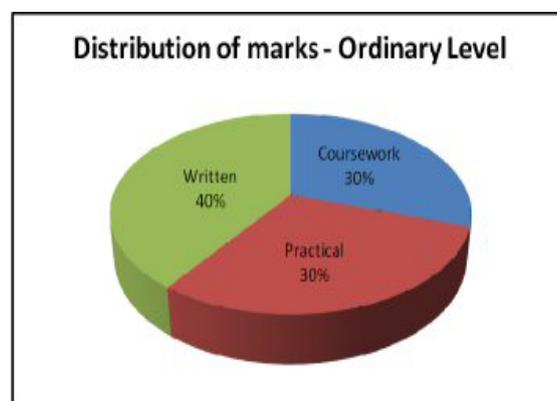
Weighting of Marks – Ordinary Level

At Ordinary Level, the written examination represents 40% of the examination, while the coursework and the practical skills test each represents 30% .

The following table and chart shows the distribution of marks for each component at Ordinary Level:

Written	Coursework	Practical	Total
200 marks	150 marks	150marks	500

Table 1: Distribution of marks - Ordinary Level



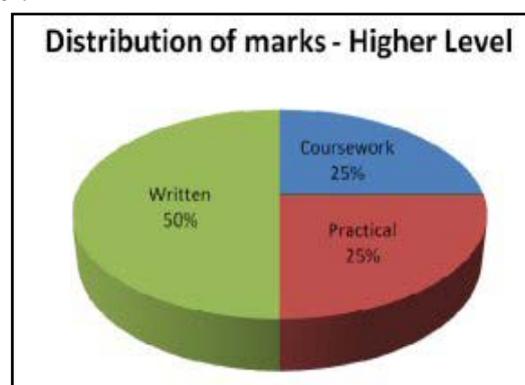
Weighting of Marks – Higher Level

At Higher Level, the written examination represents 50% of the examination, while the coursework and the practical skills test each represents 25% .

The following table and chart show the distribution and mark allocation for each component:

Written	Coursework	Practical	Total
300 marks	150 marks	150marks	600

Table 2: Distribution of marks - Higher Level



Determination of Levels

The coursework and the practical skills test are examined at a common level using common level marking schemes. The written component is examined at two levels, Ordinary Level and Higher Level. The level at which candidates present for the examination is determined by the level at which they present for the written examination.

1.2.1 The Written Examination

Ordinary Level

The Ordinary Level written examination is of two and a half hours duration and consists of a total of nine questions from which the candidate must attempt four. Question 1 is compulsory and candidates may select any other three questions from the remaining eight.

Higher Level

The Higher Level paper is of three hours duration and consists of a total of ten questions from which the candidate must attempt five. Question 1 is compulsory and candidates may select any other four questions from the remaining nine. There is a further internal choice provided in Question 10, whereby candidates may attempt either Question 10(a) or 10(b).

1.2.2 The Practical Skills Test

The Practical Skills Test is a common level examination which takes place in the school, under examination conditions, in early May. The examination is of four hours duration. This test requires candidates to interpret a drawing, mark out, process, and assemble an artefact in response to an examination paper issued by the State Examination Commission (SEC).

On completion of this examination, all test artefacts are sent to the SEC headquarters in Athlone where they are marked by a team of examiners appointed and trained by the SEC.

1.2.3 The Coursework

All candidates are required to submit individual coursework, completed in school under the supervision of the class teacher. To fulfil the syllabus requirements, the coursework must consist of an artefact and an accompanying design folio detailing all aspects, from research to manufacture of the artefact. The design folio must also contain a record of experimental work undertaken by the candidate during the course of study. The class teacher and principal are required to verify that the practical coursework submitted for assessment is the candidate's own individual work, completed in school under teacher supervision. Each year, the SEC issues instructions to teachers and candidates regarding the requirements for the submission of valid coursework. The coursework is usually commenced in year two of the Leaving Certificate programme and must be completed by a date specified by the SEC. The coursework component is examined at a common level.

Group Coursework

To facilitate appeal by an individual candidate, each candidate is required to submit separate individual coursework. Group coursework is not acceptable for the purpose of assessment.

1.4 Candidature

Table 3 and the accompanying graph below shows the total number of candidates taking Construction Studies and the total candidature of the Leaving Certificate over the past three years. As is evident from the information presented, the uptake of Construction Studies has remained fairly constant with 23.3% of the Leaving Certificate cohort taking Construction Studies in 2009 as compared with 23.1% in 2008.

Year	Total Cohort	Construction Studies
2007	36,790	8,342
2008	37,639	8,713
2009	39,112	9,130

Table 3: Total cohort and Construction Study cohort 2007-2009

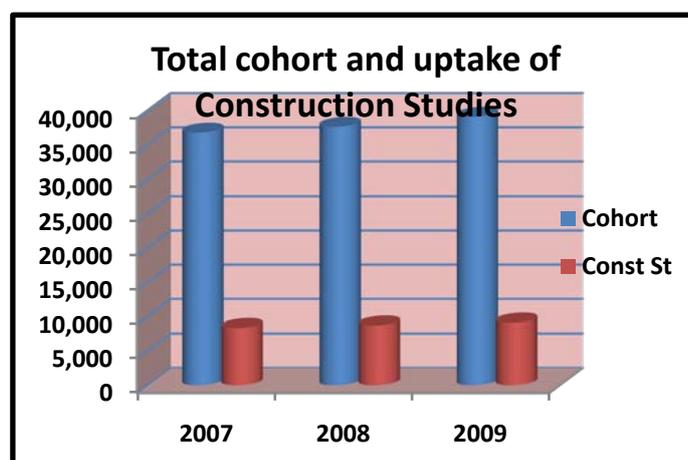
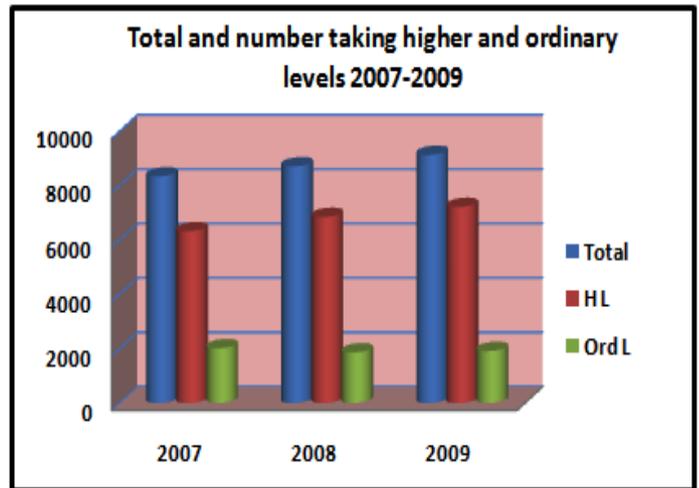


Table 4 and the accompanying graph show the number of candidates taking Construction Studies at each level for the past three years. As is shown in the table and graph, in 2009 79.0% of the cohort took Construction Studies at Higher Level and 21% at Ordinary Level and the ratio has remained fairly constant over the past three years

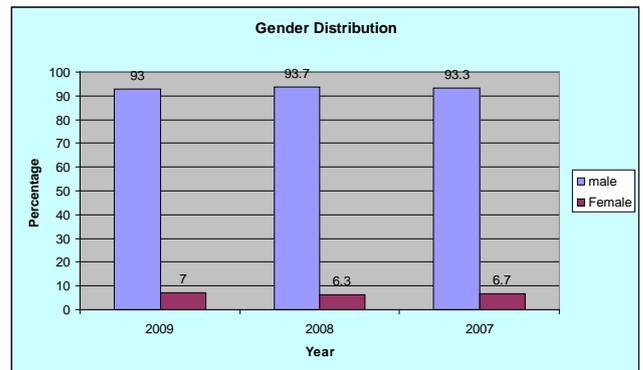
Year	2007	2008	2009
Total	8,342	8,713	9,130
Higher Level	6,326	6,848	7,213
Ordinary Level	2,016	1,865	1,917

Table 4: Total number of candidates taking Construction Studies and the numbers taking Ordinary and Higher Levels 2007-2009



Participation of Candidates by Gender

The participation of female candidates in Construction Studies, at 7.0% of the cohort, remains low and is consistent with preceding years. The participation of females and males for 2007 – 2009 is shown in the accompanying graph.



Participation by gender 2007-2009

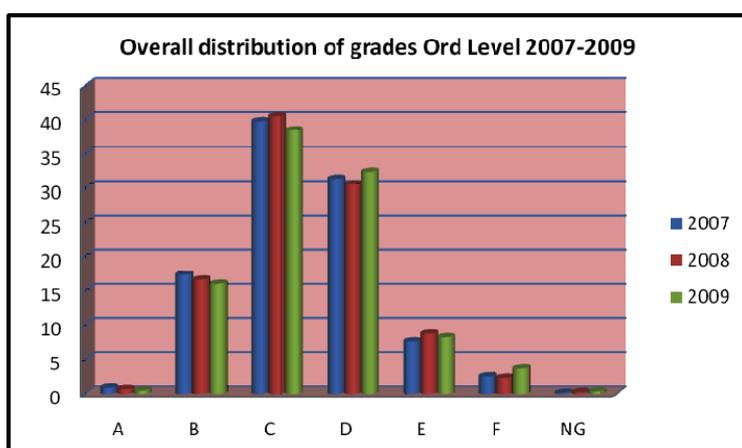
2. Performance of Candidates

2.1 Performance of Candidates at Ordinary Level

The table and graph below show the overall performance of candidates at Ordinary Level over the past three years when all three components of the examination are included. As can be seen from the table, a fairly consistent pattern of grade distribution emerges across the three years. Over half the candidates (55.1%) obtained a C grade or higher and this is a commendable achievement. However, only 0.5% of candidates achieved an A grade when all three components are computed. The percentage of candidates not achieving a D grade remains fairly constant and has increased slightly from 11.5% in 2008 to 12.4% in 2009.

	A	B	C	ABC	D	E	F	NG	EFNG
2007	0.9	17.4	39.8	58.1	31.4	7.7	2.6	0.2	10.5
2008	0.7	16.7	40.5	57.9	30.6	8.8	2.4	0.3	11.5
2009	0.5	16.1	38.5	55.1	32.4	8.3	3.7	0.4	12.4

Table 5: Overall distribution of grades, Ordinary Level 2007 – 2009



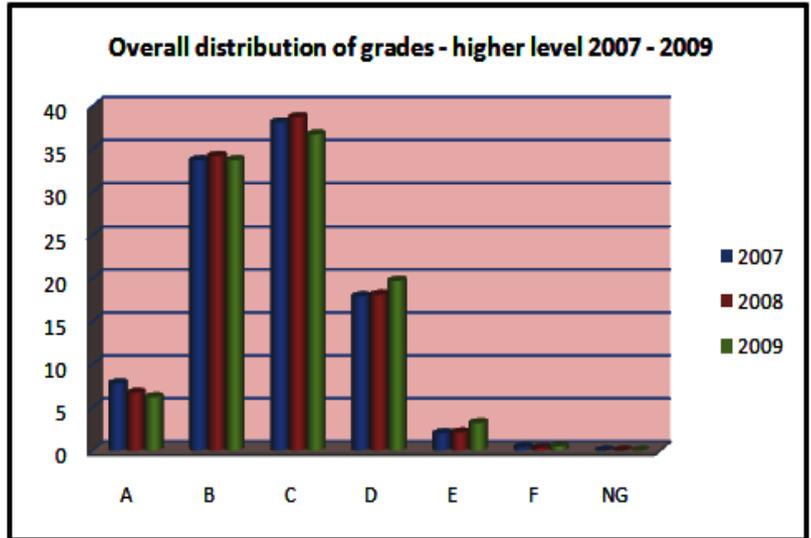
2.2 Performance of Candidates at Higher Level

Table 6 and the accompanying graph show the overall performance of candidates for the past three years in Construction Studies - Higher Level - when all three components of the examination are included.

	A	B	C	ABC	D	E	F	NG	EFNG
2007	7.8	33.7	38.1	79.6	17.9	2.0	0.4	0.0	2.4
2008	6.7	34.2	38.7	79.6	18.1	2.1	0.3	0.0	2.4
2009	6.2	33.7	36.7	76.6	19.7	3.2	0.5	0.0	3.7

Table 6: Overall distribution of grades - Higher Level 2007 - 2009

As can be seen from an analysis of the data, a consistent pattern of grade distribution emerges across the three years. More than 3 out of 4 candidates (76.6%) who sat Construction Studies in 2009 at Higher Level achieved a C grade or higher. The percentage of candidates who did not achieve a D grade remains low at 3.7% in 2009 but shows an increase of 1.3% on 2008 and 2007.



There is also a consistent pattern across the other grades - with the B grade at 33.79% in 2009 showing a decrease of 0.5% on the 2008 figure of 34.2%. The C grade shows a decrease of 2.0%, from 38.7% in 2008 to 36.7% in 2009.

A total of 96.3% of candidates achieved a D grade or higher in Construction Studies, Higher Level in 2009.

3. Written Examination – Ordinary Level

3.1 A total of 1917 candidates sat the written examination at Ordinary Level. This represents 21.0% of the cohort taking Construction Studies in the Leaving Certificate in 2009.

3.2 Performance of Candidates

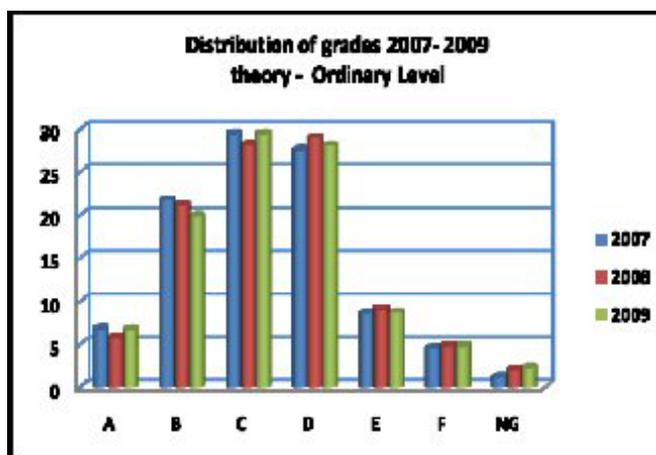
The accompanying table and graph show the percentage of candidates achieving each grade in the Ordinary Level written examination for the years 2007 to 2009 inclusive. As can be seen from the table, the final results for 2009 accord closely with those of previous years.

As can be seen from Table 7 and the accompanying graph, over half the candidates (56.1%) obtained a C grade or higher in the written paper in 2009. This is consistent with the pattern of previous years and represents an increase of 1.0% on the 2008 outcome but is lower than the 2007 combined A+B+C grades of 58.1%.

Year	A	B	C	ABC	D	E	F	NG	EFNG
2007	6.8	21.8	29.5	58.1	27.6	8.6	4.5	1.2	14.3
2008	5.7	21.2	28.2	55.1	29.0	9.1	4.8	2.0	15.9
2009	6.7	19.9	29.5	56.1	28.1	8.7	4.8	2.3	15.8

Table 7: Distribution of grades - Ordinary Level - written examination 2007-2009

The 6.7% A grade in the written examination is consistent with the outcomes of recent years. There is also a reasonably consistent pattern across the other grades - although the B grade at 19.9% in 2009 shows a decrease 1.3% on the 2008 figure of 21.2%, the percentage achieving a C grade is the same as 2007.



A total of 15.8% of candidates did not succeed in achieving a D grade in the written examination. The combined E+F+NG grade is almost identical with that of 2008, showing a decrease of 0.1%, from 15.9% in 2008 to 15.8% in 2009. Examiners reported that candidates who did not achieve a D grade at Ordinary Level did not attempt the required four questions and, consequently, could not obtain sufficient marks from the questions completed to achieve a

D grade. It is noted that although 15.8% of candidates did not achieve a D grade in the written examination in 2009, a total of 12.4% of candidates overall did not achieve a D grade in Construction Studies at Ordinary Level. (See table 5 above). Thus, in this examination candidates performed better in the coursework component and in the skills test than in the written examination and this assisted them in achieving a better overall result when the outcomes of all three components are combined.

3.3 Analysis of Candidate Performance

General observations:

The written examination at Ordinary Level consists of a total of nine questions from which the candidate are required to attempt four. Question 1 is compulsory and candidates may select any other three questions from the remaining eight. All questions carry an equal weighting of 50 marks.

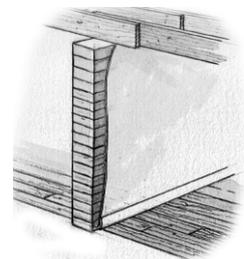
The 2009 examination paper covered a wide range of topics and thus afforded candidates at Ordinary Level an opportunity to demonstrate their knowledge over a wide content area.

The following commentary is based on the observations of examiners together with an analysis of the random sample of 280 scripts.

Question 1 *Section through a load-bearing internal wall, floor and foundation*

This question is compulsory and was attempted by 83% of candidates in the sample.

Responses were generally good and most candidates were familiar with the detailing for the foundation and the solid concrete floor, which provided candidates with a starting point in answering the question. However, some candidates confused an internal block wall and an external cavity wall and gave the details of an external cavity wall. Candidates are advised to read the question carefully and to refer to the accompanying sketch as an aid to



deciphering the text. While most candidates showed the position of the radon barrier, many candidates did not show the continuity for completeness of the barrier across the wall. A small number of candidates omitted the skirting board and some did not show the floor detailing on both sides of the wall, as was required. The average mark was 29 marks for this question.

Question 2 *Insulation of main areas of a dwelling house*

Part (a) of this question assessed candidates' understanding of the need for adequate insulation and the correct method of application. This was a popular question and was attempted by 40% of the cohort at this level. Some candidates did very well in this question and included both notes and sketches as was required and thus achieved high marks. Many candidates did not give the detailing required for two areas of the dwelling and consequently lost marks. Some candidates did not include annotation in the sketches and often did not specify the type and thickness of insulation required.

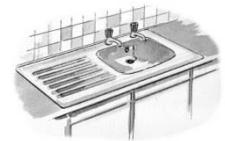


Part (b) was generally well answered and almost all candidates gave two reasons why insulation is necessary in a house. The average mark was 27 marks for this question.

Question 3 *Plumbing layout for hot and cold water*

This was a popular question and was attempted by 40% of the Ordinary Level cohort. It was also a well answered question and many candidates achieved high marks - the average mark achieved was 32 marks.

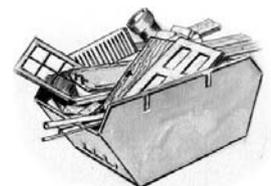
Many candidates who attempted this question showed a sound knowledge of the plumbing necessary to supply hot and cold water to a kitchen sink. Most candidates understood the necessity of direct plumbing of cold water to the sink from the primary supply.



Part (b) was also generally well answered; a small number of candidates confused the concept of keeping water hot with the actual heating of the water.

Question 4 *On-site waste management, disposal and recycling of waste*

With the exception of Question 1 which is compulsory, this was the most popular question and was attempted by 59% of the cohort. The question was also generally well answered and candidates showed knowledge of the environmental issues associated with the disposal of building waste. Examiners suggested that the accompanying sketch was of assistance to candidates in focussing on the issue of proper waste disposal. Again candidates lost marks by omitting either the note or the sketch where both were required. Candidates are advised to read all parts of the questions carefully and to submit both notes and sketches where both are required in the question. Failure to do so results in marks being lost. In Part (a) some



candidates confused environmental hazards with safety guidelines. Most candidates scored well in parts (b) and (c) and demonstrated an understanding of both the safe disposal of waste and of recycling. The average mark achieved was 29 marks.

Question 4 *Scale drawing through ridge rafters and collar tie*

This question was based on the theme of the pitched roof and candidates were required to produce a scale drawing of the roof detailing from the ridge to below the collar tie. This was not a popular question with only 12% of the cohort attempting it. While the average mark achieved – 23 marks – was low, some candidates produced very good scaled drawings and scored well in this question.



However, many candidates did not produce a drawing to scale and resorted to freehand sketching. Many did not show the location of the insulation, as was required, and thus lost marks. Most candidates correctly labelled the roof components and gave their typical sizes.

Question 6 *Safety precautions and safety on site*

This was a very popular question and was attempted by 57% of the cohort. This was also a well answered question and the vast majority of candidates had little difficulty in outlining specific safety precautions to be observed for the tasks outlined. Examiners reported that candidates showed an increased awareness of the need for a wide range of safety precautions for the range of tasks outlined. The average mark achieved was 29 marks.

Question 7 *Rainwater collecting, discharge and harvesting*

This question was attempted by 40% of the cohort. Most candidates had little difficulty in showing the collection of rainwater to a gutter and discharge through a downpipe. However, many candidates experienced difficulty in showing the detailing for the discharge of rainwater at ground level. Most candidates gave the typical sizes of the discharge components.



Part (b), requiring candidates to identify uses for stored rainwater, was generally well answered. Examiners remarked on the increased awareness amongst candidates of the issues associated with water harvesting for reuse and most candidates discussed suitable uses for stored rainwater. The average mark achieved was 29 marks.

Question 8 *Building terminology*

This was the least popular question this year and was attempted by only 11% of the cohort. This question extends across many topics and allows candidates demonstrate a wide range of

technical knowledge. It was generally not very well answered and the average mark achieved was 17 marks. While heartwood and radon barrier were well understood and explained, many candidates had difficulty in conveying the concept of thermal/cold bridge.

Question 9 *Sustainable use and preservation of wood in construction*

This final question dealt with the sustainable use and treatment of wood used externally. This was a very popular question and was attempted by 53% of the cohort. It was also a well answered question and the average mark achieved was 27 marks. Many candidates understood the environmental issues associated with the use of wood externally and scored well in part (a). Most candidates displayed a good knowledge of wood types suitable for external use and candidates were also familiar with the preservation of wood. Many candidates in part (c) omitted the sketches and consequently lost marks. Most candidates described the application of a surface treatment to wood used externally and scored well in this part of the question.



3.4 Conclusions

- Candidates attempted a wide range of questions. Question 4, on waste management and recycling, was the most frequently attempted optional question and was well answered
- Questions on environmental issues such as selection and treatment of wood used externally, safety-on-site, and insulation of buildings were popular and were generally well answered
- Freehand sketching, which is an essential skill, was, generally, not sufficiently used by candidates
- Many candidates who did not do well in the written examination had not attempted the required four questions.

3.5 Recommendations for Teachers and Students

It is recommended that teachers:

- advise students to attempt all four questions
- practise freehand sketching, colouring and rendering of sketches with students.

It is recommended that students:

- read all the examination questions carefully at the beginning of the examination and refer to the accompanying sketch for assistance where a sketch is provided
- attempt the required **four** questions and thus maximise their chances of doing well in this component
- practise freehand sketching and use this skill in the examination to convey information on technical detailing – paying particular attention to the quality of the sketches presented
- sketches should be completed using a soft 2B/HB pencil and the use of colour, shading and rendering techniques is recommended to enhance the sketches
- include both notes and sketches where both are sought. Omission of either results in a loss of marks.

4. Written Examination - Higher Level

4.1 Introduction

A total of 7216 candidates sat the examination at Higher Level, representing 79.0 % of the total cohort taking Constructions Studies in the Leaving Certificate in 2009.

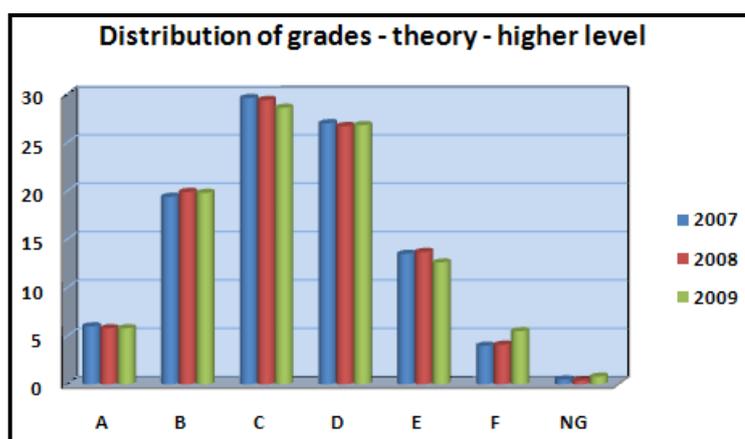
4.2 Performance of Candidates

The accompanying table and graph show the percentage of candidates achieving each grade in the Higher Level written examination for the years 2007 to 2009 inclusive. The final results for 2009 accord closely with those of previous years.

	A	B	C	ABC	D	E	F	NG	EFNG
2007	6.0	19.4	29.6	55.1	27.0	13.5	4.0	0.5	18.0
2008	5.8	19.9	29.4	55.2	26.7	13.7	4.1	0.4	18.1
2009	5.8	19.8	28.6	54.2	26.8	12.6	5.5	0.8	19.0

Table 9: Distribution of grades - theory - Higher Level 2007 - 2009

As can be seen from Table 9, there is little overall variation in the distribution of grades across the three years at Higher Level. The A grade at 5.8% remains consistent for 2008 and 2009. The combined A+B+C grades, at 54.2% for 2009, shows a slight decrease of 1.0%



from 2008. There is a slight increase of 0.9% in the percentage of candidates that achieved a D grade in the written paper, from 18.1% in 2008 to 19.0% in 2009. Noting that the combined E+F+NG rate is at 19.0% in the written examination, candidates are advised to establish a more balanced distribution of their time between the three components – written, practical and coursework and are advised to accord more time to the study of the theoretical aspects of the course.

4.3 Analysis of Candidate Performance

General observations:

The written examination paper offers candidates a wide choice of questions on a variety of building, architectural and heritage topics. Some candidates were very well prepared and their

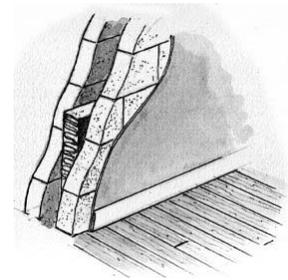
answering was exemplary. Other candidates had not completed the necessary preparation. The written examination proves to be the most challenging component for candidates. In the 2009 examination a total of 19.0% of candidates did not achieve a D grade in the written examination at Higher Level.

Many questions require candidates to present architectural detailing using notes and freehand sketches. Frequently, the quality of the sketching was poor and consequently candidates lost marks. The marking scheme indicates the marks awarded for the sketching component in each question. Where candidates are asked to provide notes and sketches, candidates are advised to include both notes and sketches in their answers. Omission of either the notes or the sketches results in a loss of marks. It is recommended that candidates pay more attention to the development of freehand sketching techniques to enable them to convey technical information through the medium of high quality freehand sketches. It is further recommended that candidates be mindful that the written examination comprises 50% of the total marks for the subject at Higher Level and candidates are advised to manage their time to ensure that they spend adequate time studying for the written examination.

The following commentary is based on the observations of the examiners and an analysis of the random sample of 800 scripts.

Question 1 *Section through foundation, wall and suspended timber ground floor*

Question 1 is compulsory and candidates were required to make a drawing, to a specified scale, of a building detail. This question was attempted by 97.1% of candidates and the average mark achieved was 40 marks. This mark shows an improvement on the average mark achieved in the previous year of 33 marks. The general standard of scaled drawing was high. The majority of candidates drew the foundation, wall and cavity correctly according to the information provided and in line with the revised building regulations, which is commendable. Thus Part (a) of this question provided candidates with an opportunity to score high marks as candidates were given full credit for showing a total of 12 elements from a possible 19 in the required section.



Part (b) of this question required candidates to show the location of a radon barrier. This was clearly shown by most candidates, where it was annotated and often identified using a coloured line. This is good practice as candidates can show clearly that they know the exact technical detailing to prevent the ingress of radon into the building. However, a significant number of

candidates did not clearly identify and label this barrier, as was required in Part (b) of the question, and consequently did not achieve the allotted marks.

A number of candidates ignored the technical information provided in the question – leaf and cavity width - and instead drew an external 300 mm wall with a 100 mm cavity and included a foundation showing a 900 mm x 300 mm foundation pad. Candidates are advised to read carefully the technical data provided in the question and to use this technical data when setting out the solution.

A small number of candidates did not show the technical detailing for the DPC tray, the vent and the lintels over the vent. Many did not show the flexible sealant or taped joint at the junction of the floor and wall as is required, under the revised building regulations. Almost all candidates included four typical dimensions as was required.

Question 2 *Foundations*

This was a very popular question and, excepting Question 1 which is compulsory, was the most frequently attempted question. Question 2 was attempted by almost three out of four (71%) candidates.

Part (a), which required candidate to give two functional requirements of a foundation, was generally well answered and the functions of foundations were often stated. However, many candidates did not elaborate on the functional requirements and, as the answers were therefore less than complete, they could not obtain maximum marks. In order to obtain high marks at Higher Level, it is expected that candidates develop their ideas to show a deeper understanding of the concepts involved.

In Part (b), candidates were required to show three different foundation types for a domestic dwelling. Most candidates identified strip, raft and pile foundations. The standard of sketching varied considerably. Some sketches were well executed and well annotated and thus achieved high marks. Candidates should note that, where a question requires notes and sketches, both notes and sketches should be provided to obtain maximum marks. A number of candidates did not relate the width of the foundation to the width of the wall and many candidates showed the construction details for a 900 mm x 300 mm foundation pad. Where piled foundations were often shown, many candidates did not include the ground beam.

In Part (c), candidates were asked to discuss two factors that should be taken into account to ensure the maximum strength of concrete in a foundation. This was the least well answered part of the question. Candidates rarely referred to water / cement ratio and a number of candidates missed the central points and described the slump or cube tests for concrete.

Question 3 *Contemporary Glazing Systems*

This was not a popular question. It was attempted by less than one in five (19%) candidates making it the 2nd least popular question on the paper. The average mark achieved was 30 out of 60 marks. While not a popular question, candidates who did attempt this question answered reasonably well, the average mark achieved was marginally higher than that achieved in three other questions – questions 4, 9 and 10.

In Part (a), candidates were asked to discuss, using notes and sketches, two functional requirements of a contemporary glazing system for a modern dwelling house. A small number of candidates answered this thoroughly, with both detailed notes and annotated sketches, and thus were awarded maximum marks. However, most candidates gave general statements with limited discussion and elaboration of the requirements outlined and many did not include sketches, as was required. As can be seen in the published marking scheme, dedicated marks are awarded for both notes and



sketches. Candidates who omit either the notes or the sketches cannot be awarded maximum marks. Candidates are advised to read the question carefully and, where both notes and sketches are stipulated in the question, should include both in order to achieve high marks.

In Part (b), candidates were asked to discuss the design of the window with reference to environmental considerations and thermal properties. This was the least well answered part of this question. Candidates tended to merge environmental considerations and thermal properties into one general topic. Most candidates identified one relevant point. However, candidates were asked to discuss the design with reference to **both** environmental considerations and thermal properties.

A small number of candidates identified correctly the benefits of the aluminium cladding, softwood treated timber from sustainable forests, argon gas and low-e coatings. However, few identified the importance of the thermal break in the design of the window.

In Part (c), most candidates recommended double glazed uPVC windows. However, few candidates offered two reasons for their choice of frame and system. Some candidates identified triple glazed systems and aluminium cladding. A small number of candidates referred to thermally broken window frames and to low-e coating and argon and krypton filling and thus achieved high marks in this section.

Question 4 Bathroom Design and Plumbing Details

36% of candidates attempted this question, making it the 6th question in order of popularity. It was generally not well answered, having the lowest average mark of 25 out of 60 marks.



Part (a) required candidates to identify two design considerations when locating a bathroom on the first floor of a dwelling house. Some candidates answered this part very well and considered safety, sound isolation, access and proximity to pipe work in discussing the preferred location of the bathroom. Many focused on access for a person with a disability and were duly rewarded. Some candidates misinterpreted the question and referred to the internal layout of the bathroom only and thus could not achieve maximum marks.

Part (b), which dealt with the above-ground pipe work, was reasonably well answered. The quality of sketches varied. Details and sketches of P traps, S traps and deep seal traps were generally of a high standard as was the connection of waste pipes to the soil and vent pipes. Many candidates did not refer to the correct slopes of waste pipes.

Part (c) was the best answered of the three parts to this question. Most candidates identified the water and airtight seals to the WC and the venting of the system through the soil and vent pipe. Many candidates scored very well in this part of the question.

Question 5 U -Value & Heat Loss

This was the 2nd most popular question - excluding compulsory Q.1 – and was attempted by 58% of candidates. The average mark achieved was 42 out of a total of 60 marks, making this the best answered question on the examination paper.

Part (a), which required candidates to calculate the U-value of an external wall using given thermal data, was very well answered. A small number of candidates misplaced the decimal point when inputting figures into the calculator and some candidates multiplied rather than divided the thickness by the conductivity and, thus, lost marks.

In Part (b), candidates were required to calculate the annual cost of heat loss and this proved to be the most challenging part of the question. Some candidates were well prepared and had little difficulty with the calculations and scored high marks. However, some candidates experienced difficulties with the calculations and other candidates omitted this part of the question.

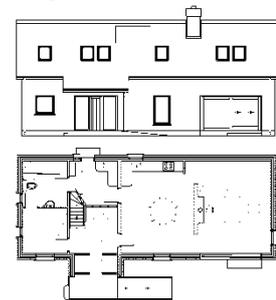
Part (c), which required candidates to specify one method of upgrading the thermal property of a typical 1970's house, was well attempted. Most candidates understood the various methods

of applying insulation either externally or internally and there were some excellent sketches. Most candidates achieved high marks in this part of the question.

Question 6 *Low Environmental Impact Design*

This topic has increased in popularity in recent years, indicating a raised awareness among both teachers and candidates of the importance of environmental considerations in ecological house design. In 2007, 39% of the candidature attempted this question and in 2009 it was attempted by 52% of the cohort. The average mark achieved for this question in 2009 was 31 out of 60 marks, whereas the average mark achieved in 2007 was 24 marks.

Part (a), which required candidates to discuss three advantages of designing a house to have a low environmental impact, was generally well answered. Some candidates gave general points and provided only a brief discussion on the points outlined and thus could not achieve maximum marks. Many candidates discussed and analysed in depth the points outlined and in such instances scored very well. Consequently the marks for this section ranged from 15 to 30 marks with many in the 15 to 22



mark range from a maximum of 30 marks. A small number of candidates misinterpreted what was required in the question and included answers relating to aesthetics and the impact of the design on the landscape.

In Part (b), candidates were required to provide an environmental critique of a given house design under various headings. In general, candidates displayed a good understanding of the issues in considering low environmental impact design. Concepts such as low embodied energy, reduced carbon footprint, narrow building width, economical use of space etc. all featured prominently and many candidates scored well in this section. Some candidates did not analyse the given design in detail and did not relate their sketches to the given design and, consequently, lost marks.

Question 7 *Scale drawing of timber framed building*

This optional scaled drawing question was attempted by 51% of candidates. The average mark achieved was 30 out of a total of 60 marks.

Candidates attempting this scaled drawing question were well informed on the eaves and roof details. However, details of the timber frame inner leaf were often omitted and a standard concrete wall was drawn instead. The requirement to include four typical dimensions was well answered.

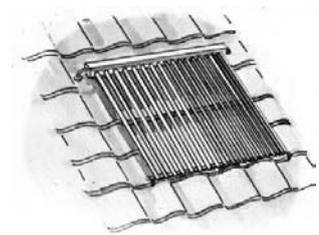


Part (b), requiring the candidate to indicate the continuity of insulation from the wall to the roof structure, was rarely attempted.

Question 8 *Zoned heating systems and solar collectors*

This question was attempted by 41% of candidates. The average mark achieved was 30 marks from a possible 60.

In Part (a), candidates were required to show the design of a zoned heating system and this was, generally, well answered. Most candidates understood primary flow and return and the pipe work layout necessary to accommodate radiators on both floors. However, some candidates did not include the necessary diverter valves or lever valves and room thermostats to achieve the required zoning. Other candidates drew a general heating layout and did not include the specifications required to provide a zoned heating layout and thus could not achieve maximum marks.



In Part (b), most candidates located the solar collector and indirect cylinder. However, some candidates did not include the twin coil cylinder necessary when connecting a solar heating system to an existing system. The expansion vessel and air vent were rarely included. The final part of the question, which required candidates to outline advantages of including a solar collector, was very well answered with most candidates understating the concept of fossil fuel depletion and renewable energies. Poorly annotated sketches contributed to the relatively low average mark of 30 marks (50%) for this question. Candidates are advised to read the questions carefully and to include, as in this question, both notes and sketches where both are required. Failure to do so results in a loss of marks.

Question 9 *Designing for air tightness*

The theme of this question introduced the concept of air tightness as a means of reducing the loss of preheated air from a dwelling house. This question was attempted by 33% candidates. The average mark achieved in this question was 29 marks.

In Part (a), many candidates identified doors, windows, trapdoors vents and fireplace openings as possible air leakage routes in a dwelling house and used notes and freehand sketches to show the correct design detailing to improve the air-tightness level at each area identified. Some candidates had a good understanding of the methods required to reduce air leakage and provided sketches showing draught strips, taped junctions and junctions air sealed using proprietary sealants. Such candidates scored well. However, some candidates misinterpreted

the question and confused air tightness with cold/thermal bridging at window cill and at wall plate level. Sketches varied in standard and good sketching was awarded high marks. As the skill in producing clear, well proportioned freehand requires regular practice, candidates are advised to practise freehand sketching, both from observation and from memory, on a regular basis over the two years of study.

Part (b), which required candidates to discuss in detail two advantages of improving the airtightness performance of a dwelling house, was generally well answered, with many candidates showing an understanding of energy conservation. However, some candidates just listed two advantages of airtight design but did not elaborate nor discuss the advantages in detail, as was required. Candidates are advised to elaborate on points raised when asked to discuss a topic in detail. Merely listing relevant points without adequate discussion and elaboration will not achieve high marks.

Question 10 *Passive solar design*

This question was the least popular question and though attempted by only 1 in 12 candidates, it was generally well answered. The average mark achieved was 32 marks, making this the fourth best answered question, indicating that candidates who attempted this question had a good understating of the principles associated with passive solar design.

Part (a), which required candidates to discuss the importance of two design considerations in passive solar design, was generally well answered, with candidates showing a sound knowledge of the various design considerations. The use of controlled air changes was least understood and was rarely addressed.

Part (b), which required candidates to identify and justify a preferred orientation, was very well answered and some of the sketching in this section was excellent.

In Part (c) most candidates understood how overheating might be prevented and many suggested blinds, projecting eaves, tinted glass and deciduous trees as a means of reducing the possibility of overheating. While the sketching was generally good, the accompanying notes were often brief and, in many cases, did not provide sufficient detail to allow candidates achieve high marks.



Question 10 (b) *Sustainable design and planning recommendations*

Candidates were asked to analyse a given statement and to propose guidelines for sustainable housing development in Ireland. Almost one in three candidates (29%) attempted this question placing it eight in terms of popularity of questions. Examiners suggested that there was considerable discrepancy in the range of answers provided. A careful reading of the question was required in order to analyse and comment on each point raised in the quotation.

Candidates are assessed on the quality of arguments presented and on their abilities to present and develop their own ideas and draw appropriate conclusions. Some candidates who attempted this question demonstrated a deep understanding of issues relating to sustainable development, analysed the given statement and proposed thoughtful guidelines. Such candidates scored very well. Other candidates did not have the in-depth understanding of the issues raised in the question nor the analytic skills to propose and develop adequate guidelines. The responses of such candidates tended to be brief and perfunctory and did not provide sufficient analysis to achieve high marks. This resulted in a low average mark of 25 marks for this question. As this question admits to open ended responses and to personal observation supported by cogent arguments, candidates are advised to read this question carefully and to analyse the main points raised. The ability to analyse and summarise a statement are prerequisites to obtaining high marks in this question.

4.4 Conclusions

- While some candidates were very well prepared for this examination and their answering was exemplary, the written examination proves to be the most challenging component for many candidates.
- Candidates generally demonstrated an increased awareness and understanding of the importance of environmental issues in ecological house design
- Many questions required candidates to present architectural detailing using notes and freehand sketches. Frequently, the quality of the sketching was poor and consequently candidates lost marks for this component. Candidates should also note that, where they are asked to use notes and sketches, they should do so; if they omit either the notes or the sketches they will lose marks.

4.5 Recommendations for Teachers and Students

It is recommended that teachers:

- ensure that an adequate balance is achieved between the theoretical, practical and coursework components of the course
- emphasise the importance of high quality sketches as a means of communicating architectural detailing and encourage students to keep a sketchbook for regular practice of sketching.

It is recommended that students:

- read the questions carefully so as to ensure that they respond to what is being sought in the question
- pay more attention to the development of freehand sketching techniques to enable them to convey information using high quality freehand sketches
- be mindful that the written examination comprises 50% of the total marks for the subject and that they plan their time to ensure that they spend adequate time studying for the written examination

5. The Practical Skills Test

5.1 Introduction

The Practical Skills Test consists of interpreting a given drawing, marking out, processing and assembling an artefact to a given specification from a drawing prepared by the SEC. The examination is of four hours duration and is conducted in schools in May and is marked in The SEC Headquarters in Athlone by examiners appointed and trained by the SEC. The Practical Skills Test is offered at a common level. A total of 9112 candidates sat this test in 2009.

5.2 Performance of Candidates

Table 10 and the accompanying graphs show the overall distribution of grades for the Practical Skills Test from 2007 to 2009 inclusive. The final results accord closely with those of previous years.

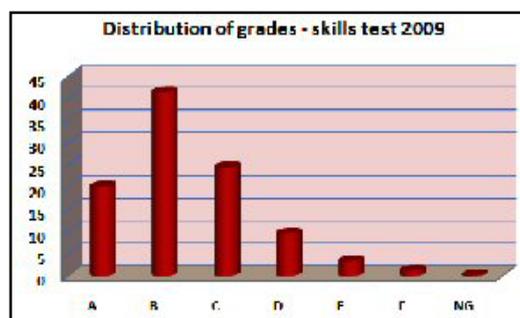
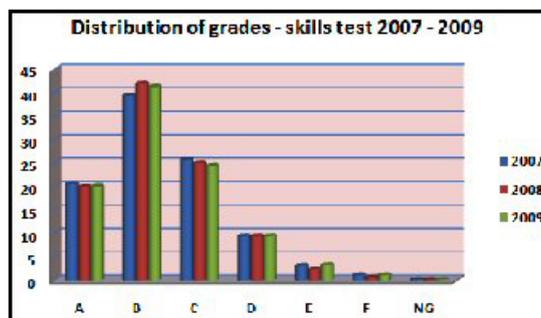
	A	B	C	ABC	D	E	F	NG	EFNG
2007	20.6	39.5	25.8	85.9	9.5	3.2	1.2	0.2	4.6
2008	20.0	42.0	25.1	87.1	9.5	2.4	0.7	0.2	3.4
2009	20.1	41.3	24.5	85.8	9.5	3.3	1.2	0.2	4.7

Table 10: Distribution of grade for practical skills test 2007 - 2009

The results for 2009 reflect very closely those of 2008, showing an increase of 0.1% in the A grade and a decrease of 0.7 % in the B grade – from 42.0% in 2008 to 41.3% in 2009. The combined A+B+C grades, at 85.8% in 2009, shows a decrease of 1.3% from 2008 but is almost identical to the combined A+B+C grades achieved in 2007.

The C grade shows a slight decrease of 0.6%, from 25.1% in 2008 to 24.5% in 2009.

The D grade remains identical at 9.5% in 2007, 2008 and 2009. The combined E+F+NG grades, at 4.7%, shows an increase of 1.3% on 2008 but is almost identical to that achieved in 2007. Examiners reported that candidates who did not achieve a D grade did little marking out and little practical work, and thus could not be credited with a higher mark.



5.3 Analysis of Candidate Performance

The overall standard was satisfactory, as is evidenced by the results obtained by many candidates. A small number of candidates produced work of outstanding skill and refinement and, consequently, obtained top marks. Most candidates were well prepared for this examination.

Interpretation of Drawing

The majority of candidates had little difficulty in interpreting the given drawings. Examiners were of the view that candidates were assisted in this regard by the three dimensional views included. Most candidates succeeded in marking out the basic frame and in determining the correct lengths of the various framing components.

Marking out

The majority of candidates succeeded in marking out all the pieces. Examiners reported that there was a wide range of marking out skills in evidence. Many candidates marked out all the pieces accurately and others did not demonstrate the necessary accuracy and attention to detail that was required. Candidates are advised, in a multi piece test such as this, to index all the pieces and to show a face side and edge mark on all pieces in the drawing. The various pieces can then be marked with face side and edge marks to correspond with these index marks. This ensures that the pieces corresponding to the various lengths are correctly identified.



The instructions for the Skills Test state that where a candidate makes an error in either the marking out or the processing of a piece, the candidate may not have that piece replaced. However, candidates are advised that they should persist with the marking out and processing and will be credited for all work which is correctly done. Where a candidate makes a mistake in the marking out, the candidates will not receive a double penalty; the candidate will lose marks for misinterpretation of the drawing and the attendant marking out but will be credited for the work carried out in processing the joints.

Candidates are advised to use the full time available for the examination, to persist with the marking out and manufacture of the artefact - as marks are awarded for all work undertaken - from marking out to manufacture to assembly.

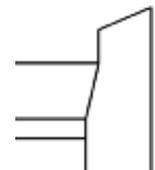
Examiners noted that candidates who were inaccurate in the initial stages of the marking out were often unable to assemble the artefact. A dovetail template, as included in the equipment list, helped candidates with the marking out the slope of the dovetails. Candidates are advised

to prepare in advance all templates as outlined in the materials list supplied to schools. Candidates who do not prepare the required templates in advance are disadvantaged as time is lost during the examination in setting the bevel to the correct slope. Candidates are advised to complete all the marking out before they commence processing. In doing so, they can check the overall lengths of all pieces and compare lengths of various pieces to ensure accuracy of measurement.

A small number of candidates did not succeed in assembling the artefact and Examiners reported that many candidates who did not approach the marking out process in a structured manner failed to complete the marking out. Many such candidates marked out just one piece at a time and then began processing that piece. This led to a disjointed sequence of marking out interrupted by processing and further interrupted by marking out. Such candidates lost time and thus were unable to complete the entire task in the time available. Candidates are advised to process the marking out of all the pieces as one sequence of operations and to check the marking out for accuracy prior to commencing the processing. When all the marking out is complete, candidates can then proceed uninterrupted with the processing of the materials. Teachers are advised to remind candidates of the importance of completing the marking out of all pieces prior to processing and of the significant mark allocation for completing the marking out process.

Mortice and tenon with splayed shoulder

The splayed shoulder in the mortice and tenon proved to be the most challenging aspect of the marking out. Some candidates treated this joint as a square shouldered joint and proceeded to mark out the mortice and tenon joints with square instead of splayed shoulders and consequently lost marks.



Most candidates showed considerable skill in the marking out, cutting and assembly of the dovetails. Some candidates demonstrated exceptional levels of skill and precision in both the marking out and the processing of the dovetails.

A small number of candidates were unable to set out the dovetail slope as required and proceeded to include finger joints instead of dovetails and, consequently, were unable to obtain the marks allocated in the marking scheme for this procedure. Errors included marking the pins on the wrong piece, executing a finger joint instead of a dovetail joint and marking the tails on the base piece instead of the vertical side pieces. Teachers are advised to ensure that an adequate time provision is made for teaching of the skills associated with the skills test, bearing in mind that this component comprises 25% of the total marks at Higher Level and 30% at

Ordinary Level. The standard of craft and assembly skills was generally high and most candidates succeeded in assembling the artefact.

Design Feature

To allow for individual expression, candidates are required to apply a design of their own choosing to the specified edges. Some candidates excelled in this area and applied unique and individual designs. However, many candidates did not apply any design feature to the edges as required and, consequently, lost marks for this procedure. Candidates are advised to complete all procedures, including the design feature. Some candidates, who otherwise did excellent work, omitted the design feature and, consequently, lost marks.

Use of machinery

The test piece is required to be hand crafted by candidates without the assistance of machinery. The artefact should demonstrate the processing skills necessary to achieve this objective. With the exception of a battery-powered screwdriver, the use of machinery is expressly forbidden in this examination. The *Instructions to Candidates* state: “*Use of machinery, except a battery powered screwdriver, is not allowed*”. The instructions governing the Skills Test are issued annually by the SEC; in poster form to schools, and to each candidate on the day of the examination. Teachers are advised to display these posters in the classroom and to apprise candidate of the regulations of the SEC regarding the conduct of the Skills Test.

Marks are deducted where there is evidence that candidates used non prescribed machinery such as the mortising machine or band saw. This is in accordance with current practice and the published marking scheme. It is recommended that teachers remind candidates of the penalty that applies where machinery is used to process materials during the examination. Where there was clear evidence of the use of machinery a penalty applies – as outlined in the marking scheme. Such candidates are marked out of 50% of the marks available for the process for which the machinery was used.

Provision of tamper evident plastic bags

Each year, tamper evident plastic bags are provided to secure the work of each candidate. Superintendents are required to ensure that all test pieces are placed in the bags and that the bags are sealed on immediate conclusion of the examination. Teachers are commended for their assistance to superintendents in ensuring that all examination materials are securely stored on completion of the examination.

5.4 Monitoring of Examination Centres

As with written examination, Examination and Assessment Managers (EAMs) from the SEC monitor the practical examinations at national level to ensure that the requirements of the SEC are complied with and to support the principle of inter-candidate equity.

The EAMs reported that the vast majority of examination centres monitored in 2009 were prepared as required and that the requirements of the SEC were fulfilled.

Role of the teacher

Circular S46/09 outlines the role of the teacher of Constructions Studies during the practical examination. Circular S46/09 states that *“the Construction Studies teacher in the school should assist in preparing the room for the examination. The teacher should also be available in the school throughout the examination and may be admitted to the examination room to deal with the replacement of damaged tools and other matters not within the competence of the Superintendent. In the interest of inter-candidate equity, the teacher must not communicate with candidates in a manner that could confer any advantage”*.

In the case of the examination centres monitored in 2009, Examination and Assessment Managers reported that teachers of Construction Studies had diligently observed these guidelines. The SEC acknowledges the work of teachers in assisting with the preparation of the examination Centres and in ensuring the smooth running of the examination

Security of examination papers

Candidates are required to return the examination paper to the superintendent at the end of the examination. As the examination may be held over a number of days, it is essential that the examination paper is not allowed out of the examination centre and that it is stored securely in the school. Circular S46/09 states that *“Candidates must not be permitted to take the question paper/drawings from the examination room at any time. The Superintendent must collect all papers at the end of each examination and return them to the School Authority. The papers which are collected at the end of each examination must be kept separate from undistributed paper.*

Teachers are advised to inform candidates in advance that they must hand up the examination paper to the superintendent at the end of the examination.

5.5 Conclusions

- Candidates were generally well prepared for the Practical Skills Test and the overall results reflect this preparation
- Many candidates showed considerable skill in the marking out, cutting and assembly of the artefact. A small number of candidates failed to assemble the artefact, due mainly to inaccurate marking out
- In the vast majority of examination centres monitored by the SEC, the examination was conducted in an exemplary manner. The SEC acknowledges the assistance of the teachers of Construction Studies and the school authorities, in the preparation of the Centres and in facilitating the smooth running of this examination.

5.6 Recommendations for Teachers and Students

It is recommended that teachers:

- ensure that an adequate time allocation is made available for teaching the skills associated with the Practical Skills Test
- display in the classroom, the posters outlining the instructions governing the Practical Skills Test and Coursework, which are issued annually by the SEC
- make students aware of the importance of completing the marking out of all pieces prior to processing and of the significant mark allocation for completing the marking out process
- remind students not to use non-prescribed machinery during the examination, and of the penalty that applies where such machinery is used to process materials
- ensure that students have only the materials specified in the cutting list and do not have access to extra or replacement pieces during the examination
- ensure that all students have prepared the necessary templates, as specified in the materials and tools list issued to each school prior to the examination
- inform students in advance that they must hand up the examination paper to the superintendent at the end of the examination.

It is recommended that students:

- read the equipment list carefully and ensure that they have all the specified materials and equipment

- prepare all specified materials and templates prior to the examination
- process the marking out of all the pieces as one sequence of operations at the beginning, and check the marking out for accuracy prior to commencing the processing
- use only the prescribed tools and equipment to process the test piece
- use only the materials specified on the materials list.

6. Coursework

6.1 Introduction

The syllabus stipulates what constitutes valid coursework for the purpose of assessment in Leaving Certificate Construction Studies as follows:

- (i) *A Building Detail, incorporating a minimum of three Craft Practices*
- Or**
- (ii) *A Building Science Project relating to Craft Practice*
- Or**
- (iii) *A Written/Drawn project relating to Craft Heritage or the Architectural Heritage or the Built Environment.*

Projects must be supported by written reports in the case of (i) and (ii), and by an element of practical work in the case of (iii), e.g., a scale model or detail from the subject under investigation. (Syllabus - Construction Studies - Rules and Programmes for Secondary Schools)

In order to fulfil the requirements of the syllabus, coursework must consist of two components:

- an artefact **and**
- a design folio/report

A practical artefact must therefore be supported by a folio/report while written/drawing coursework must be supported by a practical artefact, either a scale model or a detail from the subject under investigation.

The coursework, which is examined at common level, is initially marked in school by the class teacher in accordance with the marking scheme issued by the SEC. As many teachers are not involved in marking coursework at a national level they may not have the overview necessary to determine a national standard. Consequently the coursework is marked again by examiners who are appointed and trained by the SEC. The marks awarded by examiners are the marks that are credited to the candidates. The marks provided by the class teacher inform the work of the examiners. As is customary, examiners were well received in schools and, generally, the coursework was well presented. Examiners noted that in some examination centres, teachers and candidates put considerable effort into the display of coursework, and that the coursework was presented in neat and orderly classrooms. In some examination centres dedicated display stands or tables were provided to enhance the presentation of coursework. Such an effort is commended as it reflects a deep respect for the effort of the candidates and also offers a showcase for the creativity and skills of candidates from initial design to final completion and presentation. Regrettably, in a small number of examination centres, coursework was presented in a disorganised and cluttered manner.

Completion of documentation in schools

Coursework can only be marked when candidates have signed the necessary forms declaring that the work submitted for assessment is their own individual work, authenticated by the class teacher and school authorities. Failure to complete the necessary documentation causes unnecessary delay and a possible rescheduling of the visit of the examiner. In 2009 the necessary documentation was duly completed in the majority of schools. Teachers of Construction Studies are advised to ensure that candidates complete and sign the necessary documentation on submission of the coursework.

6.2 Performance of Candidates

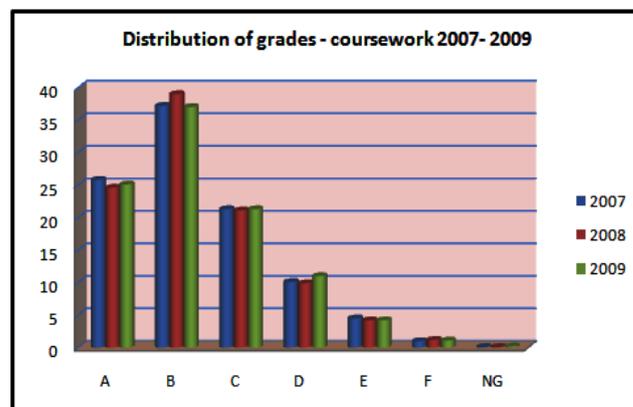
The table and accompanying graph below show the overall distribution of grades for Coursework from 2007 to 2009 inclusive. The final results accord closely with those of previous years.

	A	B	C	ABC	D	E	F	NG	EFNG
2007	25.8	37.2	21.3	84.3	10.1	4.5	1.0	0.1	5.6
2008	24.6	39.0	21.1	84.6	9.9	4.2	1.2	0.1	5.5
2009	25.1	37.0	21.3	83.5	11.0	4.2	1.1	0.2	5.5

Table 11: Distribution of grades for coursework 2007 – 2009

As can be seen, the grade distribution for 2009 is broadly in line with candidate performance over the past three years.

Over one in four candidates (25.1%) achieved an A grade in 2009. This reflects the commitment of both candidates and teachers to producing coursework of a high standard.



Some candidates submitted coursework of exceptional standard, demonstrating research, design and realisation skills. A total of 83.5% of candidates achieved a C grade or higher in 2009, representing a slight reduction of 0.9% from the previous year. The percentage of candidates who did not achieve a D grade remains low at 5.5% of the cohort, and is identical to the percentage for 2008.

6.3 Analysis of Candidate Performance

In analysing candidates' performance some generic points emerged. These are set out below under the following headings:

6.3.1 The Design Folio

The submission of the design folio to accompany the artefact affords candidates an opportunity to demonstrate the preparation, planning, research, and decision making skills required to produce an artefact. Candidates also record the experimental work undertaken during the course in the design folio. Furthermore, the design folio presents each candidate with an opportunity to demonstrate the broad range of presentation and communication skills developed during the course of study in Construction Studies. Such skills include planning, freehand sketching, scaled drawing presentation, digital media presentation and report writing. Candidates often use the design folio to display their knowledge of the environment issues associated with material selection and use, as well as personal reflection and evaluation skills. Examiners reported that a total of 777 candidates (8.6% of the cohort) - Table 13 - did not submit an accompanying design folio with the artefact, in 2009. Such candidates are disadvantaged as they cannot command the marks which are allocated to the folio and furthermore lose the marks (30 marks) for the experimental work – which must be recorded in the folio. Candidates are advised to submit a design folio along with the artefact when presenting coursework for assessment.

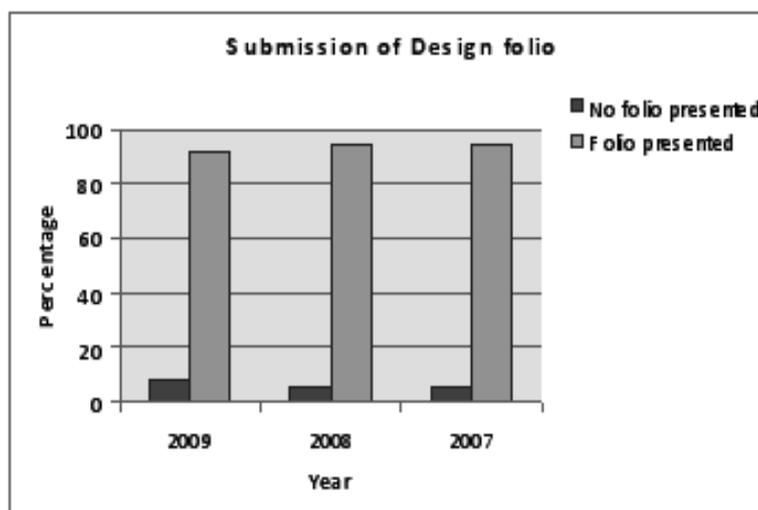


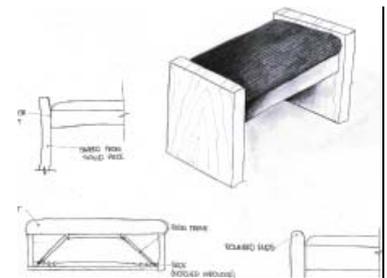
Table 13: Submission of design folio – coursework 2009

Furthermore, in 2009 a total of 140 candidates, representing 1.5% of the cohort, submitted a design folio only and did not submit an artefact as required.

Teachers are advised to stress to candidates the importance of presenting both a design folio and an accompanying artefact when presenting coursework for assessment.

Many candidates presented design folios of a very high standard and it is obvious that much time and energy was invested in the development of the portfolio. The quality of the design folios presented continues to improve, particularly in the area of presentation, as each year there is an increase in the number of candidates incorporating ICT when producing their design folios. This is a welcome development and significantly improves the presentation of work. The inclusion of quality freehand sketches greatly enhances the folio and is a further opportunity for candidates to express such talents. In 2009, Examiners reported an increase in the inclusion of drawings in SolidWorks, which is highly commended. The use of digital media and/or freehand sketching in recording the production of the artefact brings significant clarity to this section. However, it is important that such recording be supported with written description.

Some candidates, who otherwise presented very good practical work, paid little attention to the design folio and thus lost significant marks. Examiners reported that it was evident that some candidates wrote up the portfolio after making the artefact and such folios often contained only a description of the work undertaken.



Candidates are advised to develop a design folio in tandem with the artefact and to include in the folio a contemporaneous record of work in progress. The folio should contain a record of all processes and learning from inception to completion and include written descriptions, a photographic record of work in progress as well as sketches, drawings and a final evaluation and personal reflection.

Such sketches, photographs and written descriptions of work in progress all form a record that enable Examiners to readily identify that all the work submitted for assessment is the individual work of the candidate.

Investigation and Research

This is an essential element in the process of developing coursework; the extent and quality of research and investigation have a direct impact on the quality of the finished product. It is obvious that many candidates recognise this and invest a significant amount of time on investigation and research. In much of the coursework presented in 2009, there was evidence of the widespread and effective use of research sources such as the Internet, magazines, books,

libraries and television documentaries. Site visits and interviews with people as sources of information were also used.

However, in some of the coursework presented the standard of research and investigation was of poor quality. In such instances research was often limited to one or two sources. Occasionally, the information presented was not referred to or commented on by the candidate or it had little relevance to the proposed coursework. Digital images, photographs or cut outs from magazines were often included without reference, comment or conclusion. In other instances pages of downloaded information were included, often with little comment or analysis by the candidate.

Research and investigation are rewarded under the marking scheme and consequently teachers are advised to encourage candidates to investigate a range of information sources, identify and extract the material relevant to their coursework, interrogate this material and draw conclusions. If candidates engage in site visits, interviews with professionals, visits to furniture workshops or stores, they should indicate what has been learned from such activities. Candidates must reference all the information which is presented, especially where the Internet is used.

Planning coursework

Time management is a crucial skill in the development and completion of coursework by the designated closing date. Some candidates manage their time poorly and thus spend an excessive amount of time on coursework. Consequently, the time available for the study of the theoretical components is diminished and this is reflected in the poor performance of some candidates in the written examination. The management of coursework provides an ideal opportunity for learning time management skills. Candidates are advised to develop coursework management strategies such as Gantt charts which will assist them in planning and managing their time properly.

Experimentation

Candidates who investigated aspects of the coursework, constructed a hypothesis, investigated this hypothesis and derived a conclusion, succeeded in obtaining high marks. Such an approach is to be commended and candidates were rewarded accordingly. However, experimental work continues to pose difficulties for a significant number of candidates. The syllabus states that candidates are required to undertake “*experiments which are assigned and closely supervised by the teacher*”. Examiners reported that some candidates invest little time and effort in this area and, consequently, the conclusions drawn were based on the opinions of the candidate and not on evidence deduced from the experiments.

Candidates are advised to relate the experimental work to some aspect of the coursework undertaken. This provides candidates with an opportunity to hypothesise and to analyse in detail aspects of the coursework and to record the results of such analysis. It also provides candidates with an opportunity to undertake unique experimental work. Candidates who submit derivative experimental work cannot achieve the full complement of marks. It is recommended that **three** experiments be undertaken by each candidate. A detailed description of each experiment, including a clearly stated objective, should be recorded in the folio for assessment. Group or class experiments do not comply with the recommendations of the SEC.

Scale models

Examiners reported that there was a notable increase in the quality of models presented for assessment this year. It is clear that teachers and candidates are researching model making techniques and materials. However, candidates in a small number of examination centres presented models constructed using inappropriate materials and often requiring low level skills to complete. A small number of candidates did not select an appropriate scale and, in some instances, did not apply any scale to the model presented.

Evaluation

Most candidates included an evaluation and, in some instances, this recorded the personal learning of the student resulting from undertaking coursework. However, in many instances the evaluation lacked depth and focussed almost exclusively on the end product with very little reference made to broader learning outcomes. Candidates are encouraged to reflect on the learning that has occurred and to include in the folio a personal reflection on the process from initial ideas to final conclusion.

6.3.2 Range of Coursework Presented

The Leaving Certificate Construction Studies syllabus is not prescriptive regarding the type of coursework to be undertaken by candidates. The syllabus details the following areas from which coursework may be chosen and lists the following areas:

- Building detail
- Building science relating to craft practice
- Craft heritage
- Architectural heritage
- The built environment.

Candidates can select from a broad range of areas within the syllabus. However, in 2009, some class groups selected a limited range of coursework. Consequently, this limited the range of educational experiences encountered by candidates, especially where all candidates selected the same type of coursework. As candidates observe, discuss, and consult during class time, a diversity of coursework in a class group enhances and enriches the educational experience of all candidates. Teachers should encourage candidates to explore a wide variety of themes before deciding on a particular coursework type. Teachers are advised to make candidates aware of the rich architectural heritage in the country and in their locality, and candidates should be encouraged to explore the architectural and craft heritage of their local area. Such an exploration should provide candidates with a diverse, unique and interesting range of themes for coursework. As candidates grow in visual awareness during their course of study, they should be encouraged, especially in the first year of study, to explore interesting areas of research and discovery as the source for their coursework. Candidates are advised to select their coursework only after significant reflection and should consider their own strengths and motivation and the time available to plan and complete the coursework. As is outlined in the *Instructions to Candidates*, candidates should consult and discuss their proposed choice of coursework with their teacher to ensure that the resources are available to complete the coursework in school under teacher supervision and within the time available for coursework.

The coursework presented for assessment in 2009 are categorised into four groups as described:

Construction (K)

This category consists of all coursework relating to the construction of a building. The examples of coursework in this category which were presented for assessment in 2009 included: Wet trades; planning regulations; scale models or details of roofs; foundations; doors; windows; stairs; timber frame construction; sectional details etc. plumbing/ heating and drainage etc.

Furniture (L)

This category includes all items of internal and external furniture other than heritage.

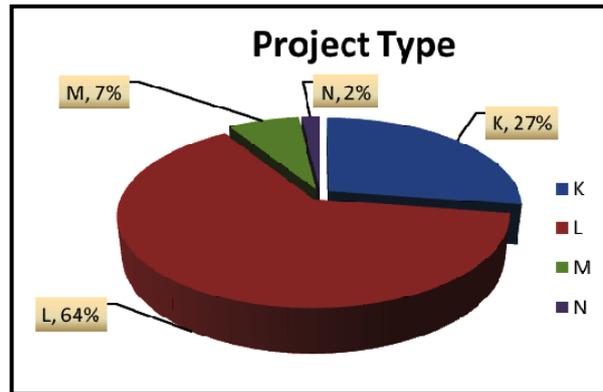
Heritage (M)

Coursework presented under this category included: buildings of historical significance; dwellings in the vernacular tradition or from a particular period; buildings and structures of architectural interest; artefacts of historical significance; building restoration and conservation and traditional skills including furniture restoration and replication etc.

New Technologies (N)

Coursework presented under this category included: geothermal, solar, wind, MHRV, rainwater harvesting; new insulation techniques and materials; innovative building methods; control technologies, smart metering etc.

The following chart and accompanying table show the type of coursework presented for assessment in 2009. As can be seen, furniture (L) continues to be the most popular type of coursework presented for assessment, with new technologies (N) being the least popular.



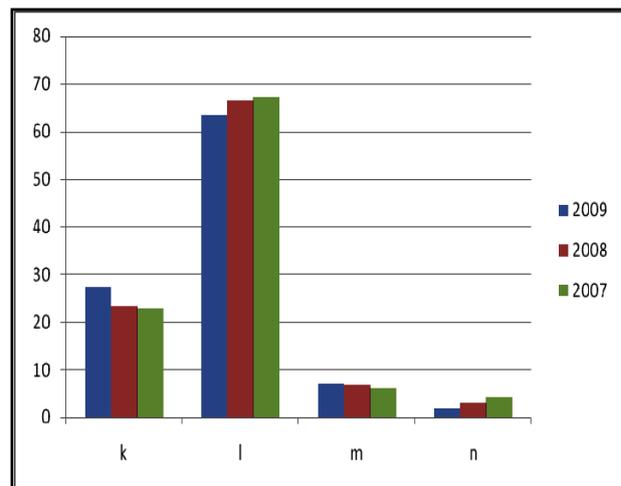
Pie chart showing coursework type undertaken in 2009

Coursework	Construction (K)	Furniture (L)	Heritage (M)	New Technologies (N)
Number (%)	2471 (27%)	5738 (64%)	646 (7%)	163 (2.0%)

Table 15: Coursework type 2009

The type of coursework presented by candidates in the last three years is shown in the graph below. This shows a reduction in furniture type

coursework (L) and an increase in the construction (K) and heritage (M) type coursework. An analysis of coursework presented by gender indicates that female candidates present more heritage and scaled model of construction details than do male candidates.



6.3.3 Quality of Coursework

Furniture (L)

Many of the items of furniture presented for assessment this year were of a very high standard and are testament to the excellence and commitment of many candidates. When such coursework contains meaningful research and design and is planned and executed to a high standard, the educational benefits to the candidate are significant.

However, in some instances Examiners reported that this type of coursework consisted in simply reproducing an existing design with very little higher order thought or creativity involved in its

development. Furniture type coursework can often be limited in focus and does not complement the broader aspect of the syllabus, designed to inform candidates about the broader issues associated with buildings and the built environment. Candidates selecting furniture type coursework should take care to select coursework that will demonstrate a broad range of abilities, skills and aptitudes.

Furthermore, candidates should be mindful of storage issues in school and are advised to design small, compact, elegant artefacts that will showcase their design and manufacturing abilities.

Candidates are advised to avoid undertaking large, cumbersome and poorly designed furniture, which often provides limited opportunity to demonstrate a range of skills and competencies and which may create storage problems within the school.



Construction (K)

The quality of work presented by a large number of candidates was of a high standard. The number of candidates presenting full size wet trades type coursework has decreased and there is a corresponding increase in the number of scaled models of building details. Overall, the number of construction type coursework has shown a slight increase in the last number of years. This type of coursework, when researched, planned and constructed to a high standard constitutes a significant learning experience for candidates and also contributes significantly to the candidates' knowledge and understanding of construction - which is also beneficial in the theoretical aspects of the subject. Furniture and construction coursework accounted for 91% of all coursework presented for assessment in 2009.

Heritage (M)

Heritage and new technologies coursework comprise less than 10% of coursework presented for assessment. Candidates who present coursework in this area are generally interested in environmental and heritage issues and many present coursework of a very high standard.



Ireland has a rich architectural and craft heritage. However much of this remains unexplored by candidates of Construction Studies. Teachers are advised to encourage candidates to investigate buildings of historical interest, both formal and of vernacular construction, and the traditional crafts associated with such buildings. Such investigations would provide a diverse and rich source of coursework for candidates and would help raise awareness among candidates of Construction Studies of the importance of the need to conserve and maintain such a rich architectural inheritance.



New Technologies (N)

As depleting natural resources and climate change are increasingly important, there have been major advances in the application of new technologies in the construction industry. It is important that candidates of Construction Studies are familiar with changing trends and technologies. Investigations of geothermal, solar and renewable energies provide candidates with significant opportunities for coursework in these areas. The Passive House provides interesting and challenging areas of research in new technologies and associated themes, and many candidates presented coursework on this aspect in 2009.

6.4 Authenticity of Coursework

Candidates are required to submit authentic coursework, duly validated by the class teacher and school authentic. Authentic coursework is the individual work of the candidate, duly completed in school under teacher supervision. Because coursework is executed over an extended period of time, the possibility of third party assistance, plagiarism or collusion is increased when compared to that of a terminal written examination. It is acknowledged that coursework is executed within a legitimate framework of advice and guidance by the teacher, offered in a class setting and given in an open and transparent manner. Furthermore, it is acknowledged that legitimate advice and guidance can be obtained from others such as parents,

guardians, siblings and friends. For instance, a parent/guardian discussing the coursework and suggesting possible sources of data and information is seen as legitimate advice. In such a situation the help is considered reasonable and benign. However, there has to be a clear demarcation between such help and encouragement from a parent, guardian or friend, and direct assistance to a candidate in completing the coursework.

In order to assure the integrity of the examination and to uphold the principle of inter-candidate equity, the conditions for the acceptance of coursework are specified in SEC Circulars S77/09 and S43/09 and also in the *Instructions to Candidates* and in the classroom posters which are issued annually to schools.

Role of the Class Teacher

The role of the teacher in both the supervision and authentication of candidate work is the key to guaranteeing the integrity of coursework submitted for assessment. In order that the teacher can authenticate and sign off on coursework as the candidate's own individual work, the instructions require that the coursework be completed in school, under the direct supervision of the class teacher. Teachers are advised not to permit candidates remove the coursework from the school to facilitate additional work - as the teacher cannot then authenticate coursework completed in an out-of-school setting. For the purposes of assessment, the SEC does not accept the authentication of third parties. During the coursework, teachers are engaged in ongoing dialogue with the candidate, supervise the ongoing work and are then in a position to authenticate legitimate coursework. The obligation resides with the candidate to fulfil the requirements of the SEC regarding the submission of valid coursework. If teachers are unable to authenticate certain coursework they indicate this to the SEC by signing form P20. The SEC supports teachers in this process and greatly appreciates the co-operation of teachers in upholding the integrity of this assessment mode.

Where there is a need for a student to do some investigative work in an out-of-school setting or to acquire a specialised component/process in order to complete the coursework, this must be done with the prior approval of the teacher. For example, if a candidate wishes to measure and survey a building, the candidate has, of necessity, to conduct some of the research out-of-school. The candidate is required to record all such work and to keep the teacher informed of the work in progress. In all such cases candidates are required to make the accompanying artefact in school under teacher supervision

In the 2009 examination the vast majority of coursework submitted by candidates was completed in accordance with the SEC'S regulations and duly authenticated by the class teacher and school authorities. Where there was evidence that the work submitted was not solely the individual work of the candidate, further investigations were conducted by the SEC to determine the authenticity of the work submitted. As a result of these investigations, a total of twenty two candidates (0.24%) were not awarded any marks for the coursework component of Construction Studies in 2009. Candidates are advised to familiarise themselves with the regulations of the SEC for the submission of valid coursework and to uphold these regulations.

6.6 Conclusions

- Examiners reported that candidates demonstrated a very high standard of practical skills in the coursework presented for assessment
- The quality of the portfolios submitted was also very high, in many instances, and it was evident that many candidates devoted much time and energy to the development of the portfolio. However, some candidates who presented very good practical work, paid little attention to the portfolio and thus lost significant marks. It was obvious, in many instances, that the portfolio was written up after the making of the practical artefact and contained only a description of the work undertaken
- Some candidates manage their time poorly and thus spend an excessive amount of time on coursework. Consequently, the time available for the study of the theory component is diminished and this is reflected in the poor performance of some candidates in the written examination. The management of coursework provides an ideal opportunity for learning time management skills
- Many of the furniture type coursework presented for assessment were not designed by the candidates but were realisations of existing designs, sourced from books and magazines. Such derivative work does not usually provide sufficient opportunities for the development of the higher order skills of research and design, expected in particular of Higher Level candidates.

6.7 Recommendations for Teachers and Students

It is recommended that teachers:

- ensure that a balanced time provision is made available for all three components of the course – practical, written, and coursework
- encourage students to plan their work in advance and to devise a coursework management log or Gantt chart to help them set targets and thus help optimise the use of time spend on coursework
- encourage students to explore a wide variety of topics and themes before deciding on a particular coursework type
- direct students' attention to the rich architectural heritage of this country and encourage them to explore the architectural and craft heritage of their local area so as to provide stimulus for a diverse range of coursework
- encourage students to develop the range of investigative and research skills
- advise students to develop the portfolio in tandem with the development of the artefact
- encourage students to keep a dedicated sketchpad to help develop sketching skills
- advise students to record in the portfolio the sources of all information, especially information sourced from the Internet
- display the relevant posters relating to coursework in the Construction Studies room and bring to the attention of all candidates the regulations contained in the relevant circulars and posters
- ensure that all students complete and sign the necessary documentation prior to leaving school
- display coursework in an attractive manner. Coursework work should be arranged in ascending numerical order and no other coursework should be displayed in the Centre.
- encourage students to keep a sketchpad from the beginning of the course and to continually make sketches of buildings and architectural detailing as a method of recording and of practising sketching techniques over the duration of the course
- not permit candidates remove the coursework from the school to facilitate additional work - as the teacher cannot then authenticate coursework completed in an out-of-school setting.

It is recommended that students:

- read the Instructions to Candidates issued by the SEC and follow these Instructions in the research and execution of their coursework
- plan their time management carefully and not spend an excessive amount of time on coursework, at the expense of the theory component
- keep a coursework management log or Gantt chart detailing targets dates set for coursework and record the work completed by each target date
- develop their folio in tandem with the artefact and ensure that the folio contains a complete contemporary record of all work-in-progress
- integrate ICT into the folio using digital media to record the on-going development of the artefact and pay particular attention on the quality of freehand sketching in the portfolio
- record all sources of information used in researching the coursework, including the Internet, and list the websites used
- carry out three experiments related to some aspect of the coursework undertaken and record in the folio the procedures followed and results obtained for each of the experiments
- produce well proportioned freehand sketches as a means of communicating technical information and detailing
- make sure, particularly at Higher Level, that the higher order conceptual skills of analysis, design, synthesis and evaluation are demonstrated in the folio and that an evaluation and personal reflection on the process is also included in the folio
- avoid undertaking large, poorly designed furniture, displaying a limited skills range and which may create storage problems within the school.
- display the completed coursework – artefact and folio – in an attractive manner and location.

