Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2005

CONSTRUCTION STUDIES

ORDINARY LEVEL CHIEF EXAMINER'S REPORT

HIGHER LEVEL CHIEF EXAMINER'S REPORT

CONTENTS

Construction Studies Examination 2005

1. General Introduction

1.1 The Syllabus

The present syllabus in Construction Studies was introduced in 1984, 22 years ago, and was examined for the first time in 1985. It replaced the 1970 syllabus which was examined at a common level only. The current syllabus is examined at two levels – Ordinary Level and Higher Level. A new syllabus, with the title Architectural Technology, awaits implementation and is to replace the current syllabus in Construction Studies.

1.2 The Examination

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

(i) Written examination;

(ii) Project work;

(iii) Skills Test.

All candidates, at both Ordinary and Higher Levels, are required to attempt all three components.

1.2.1 The Written Examination,

The written examination which is offered at two levels, Ordinary and Higher, takes place in June and is marked by examiners appointed by the State Examinations Commission (SEC).

Ordinary Level

The written examination at Ordinary Level is 2.5 hours duration and consists of a total of nine questions from which the candidate must attempt four. Question 1 is compulsory and candidates select any other three questions from the remaining eight.

Higher Level

The written examination at Higher Level is of 3 hrs duration and consists of a total of ten questions from which the candidate must attempt five. Question 1 is compulsory and candidates select any other four questions from the remaining nine. There is a further internal choice provided in Question 10, as candidates may answer one of two parts of this question.

1.2.2 The Skills Test

The Skills Test consists of interpreting a drawing, marking out, processing and assembling an artefact to a given specification according to the drawing supplied by the SEC. This examination, which is of 4 hours duration, takes place in schools in May and is marked in Athlone by examiners appointed by the SEC. This component is offered at a common level only.

1.2.3 The Project

The Project consists of an artefact and a folio, which details the research and manufacture of the artefact. The folio must also contain a record of experimental work undertaken by the candidate during the course of study. Each candidate is required to submit an individual project, completed in school under the supervision of the class teacher. Each year, the SEC issues instructions to teachers and candidates regarding the requirements for the submission of valid project work. The SEC also issues a completion date for the project. The project, which is examined at common level, is marked in school by the class teacher in accordance with the marking scheme issued by the SEC. The marks awarded by the class teacher are subsequently moderated in the schools by Examiners, who are appointed and trained by the SEC.

1.2.4 Weightings and Mark Allocations

Ordinary Level

The written examination represents 40% of the examination, while the project and practical skills test represent 30% respectively. This weighting is reflected in the mark allocation for each component. The following table and chart shows the weighting and marks allocation for each component**:**

Written	Project	Skills Test	Total
200 marks	150 marks	150marks	500

Table 1: Allocation of marks - ordinary level

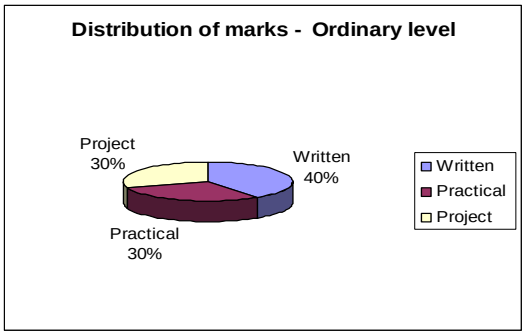


Table 2: Weightings - Ordinary Level

Higher Level

The written examination represents 50% of the examination, while the project and practical skills test represent 25% respectively. The following table and chart shows the weighting and mark allocation for each component**:**

Written	Project	Skills Test	Total
300 marks	150 marks	150marks	600

Table 3: Allocation of marks - higher level

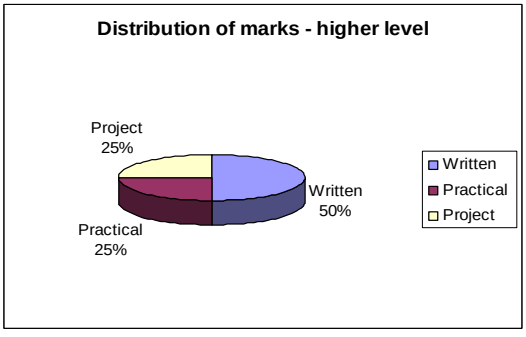


Table 4: Weightings - Higher Level

Determination of Levels

In the present syllabus, the project and skills test are examined at a common level using common marking schemes. The written components are examined at two levels, Ordinary and Higher. The level at which a candidate is awarded a grade is determined by the level of the written paper taken by the candidate.

1.3 Candidature

Tables 5 and 6 below show the total number of candidates taking Construction Studies and the total candidature taking the Leaving Certificate for the past three years. As can be seen from the tables, the uptake of Construction Studies is fairly constant over the past three years. Noting that there has been a decline of 2168 in the total candidature since 2003, there has been an increase of 186 candidates taking Construction studies from 2004 to 2005.

Year	2003	2004	2005
Total cohort	56,237	55,222	54,069
Const Studies	8898	8834	9020

Table 5: Leaving Certificate cohort and Construction Studies cohort 2003-2005

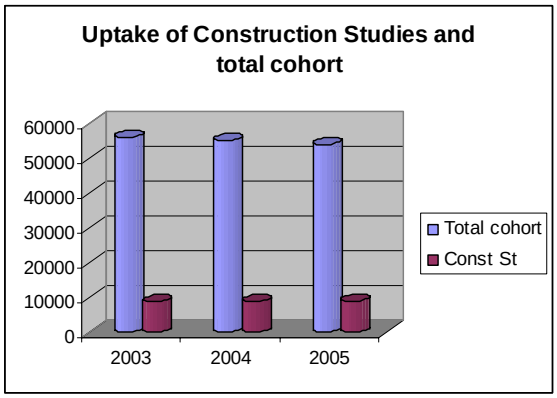


Table 6: Total cohort and Construction Studies cohort 2003-2005

Tables 7 and 8 show the number of candidates taking Construction Studies at both levels for the past three years. As can be seen from the tables, almost three out of every four candidates (74%) took Construction Studies at higher level in 2005 and that ratio has been fairly constant over the past three years.

Year	2003	2004	2005
Total	8898	8834	9020
Higher level	6569	6609	6719
Ordinary level	2329	2225	2301

Table 7: Total number of candidates taking Construction Studies and numbers at Ordinary and Higher levels 2003-2005

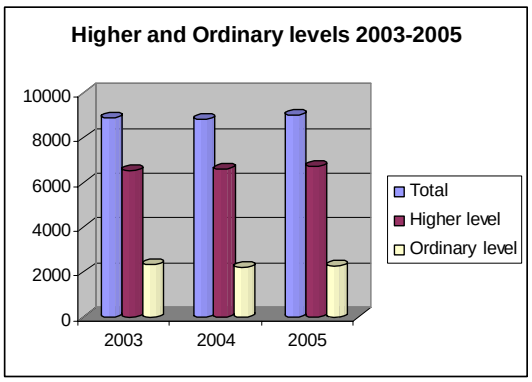


Table 8: Total number of candidates taking Construction Studies and numbers at Ordinary and Higher levels 2003-2005

2. Performance of Candidates

2.1 Performance of Candidates at Ordinary Level

The following table and graph 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 an analysis of the data, a consistent pattern of grade distribution emerges across the three years.

	A	B	C	ABC	D	E	F	NG	EFNG
2003	1.3	21.2	43.8	66.3	26.1	6.1	1.3	0.1	7.5
2004	0.9	19.6	40.9	61.4	28.6	7.6	2.2	0.1	9.9
2005	0.6	17.8	42.9	61.3	30.1	7.0	1.6	0.0	8.6

Table 9: Percentage of candidates achieving each grade at Ordinary Level 2003 – 2005

While the A grade remains low in 2005 (0.6%), a total of 61.3% of candidates achieve a C grade or higher at this level. The percentage of candidates not achieving a D grade (8.6%) remains fairly constant. As can be seen from the graphs, the vast majority of candidates perform well in the subject at this level.

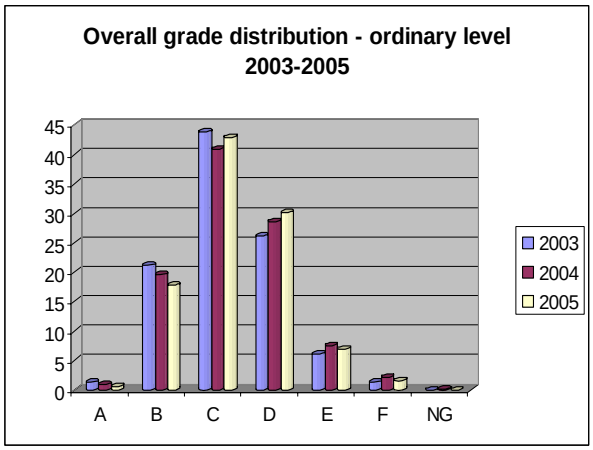


Table 10: Overall distribution of grades at Ordinary Level 2003 –2005

2.2 Performance of Candidates at Higher Level

The following table and graph show the overall performance of candidates at Higher Level for the past three years when all three components of the examination are included. As can be seen from an analysis of the data, a consistent pattern of grade distribution emerges across the three years.

	A	B	C	ABC	D	E	F	NG	EFNG
2003	6.3	36.9	39.1	82.3	16.0	1.5	0.2	0	1.7
2004	6.7	34.6	39.3	80.6	16.7	2.3	0.3	0	2.6
2005	6.8	35.1	38.3	80.2	17.5	2.0	0.2	0	2.2

Table 11: Percentage of candidates achieving each grade at Higher Level, 2003 - 2005

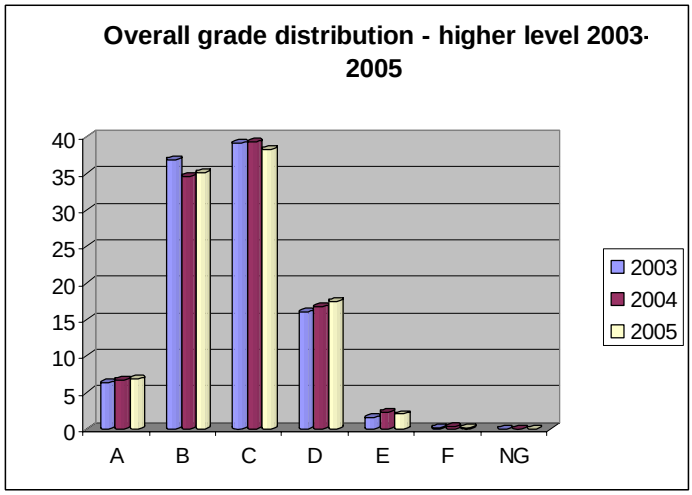


Table 12: Overall distribution of grades – Higher Level 2003-2005

As can be seen from the above table, there is very little variation in the distribution of grades across the three years at Higher Level. Candidates perform well in this examination with over 80% of candidates achieving a grade C or higher. The percentage of candidates not achieving a D grade is also low. While 6.8% of candidates achieved an A grade overall in 2005, 21.2% of candidates achieved an A grade in the skills test component. It is noted that candidates perform significantly better in both the skills test and the project component than they do in the written examination.

3. Written Examination - Ordinary Level

3.1 Introduction

A total of 2301 candidates sat the examination in Construction Studies at Ordinary Level in 2005, representing 26% of the total cohort. A total of 190 (8.25%) of these candidates were female.

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 2003 to 2005. The final results for 2005 accord closely with those of previous years.

Table 13: Percentage of candidates achieving each grade in the written examination – 2004 - 2005

	A	B	C	ABC	D	E	F	NG	EFNG
2003	6.2	23.3	32.0	61.5	25.5	7.4	4.4	1.2	13.0
2004	6.0	20.1	28.8	54.9	29.3	9.1	4.4	2.3	15.7
2005	5.6	18.9	29.0	53.5	30.3	9.8	4.6	1.7	16.2

Note*: The grades here are indicative only. The grades awarded to candidates in Construction Studies are computed from the combined results of the relevant components completed by candidates*

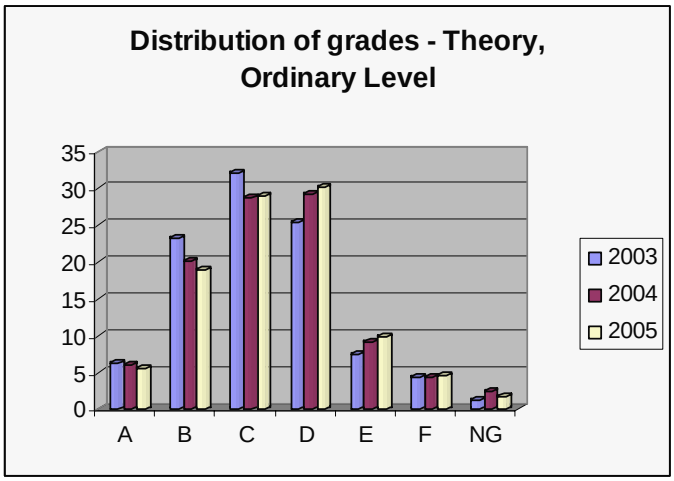


Table 14: Distribution of grades - Ordinary Level, written examination, 2003-05

The overall A grade shows a slight decrease of 0.4% - from 6.0 % in 2004 to 5.6% in 2005 and the combined E+F+NG grades shows a slight increase of 0.5% from 2004, from 15.7% in 2004 to 16.2% in 2005. It is to be noted that the there has been an increase in the A and B grades since 2000.

As can be seen from the graph, almost half the candidates (53.5%) obtained a C grade or higher in the written paper in 2005. However, a total of 16.2% of candidates did not succeed in achieving a D grade.

An analysis of the 2005 responses confirmed that candidates who did not achieve a D grade did not attempt the required four questions and consequently could not obtain sufficient marks from the answers provided to achieve a D grade. It is also noted that although 16.2% of candidates did not achieve a D grade in the written examination, only 8.6% did not achieve a D grade overall in Construction Studies at Ordinary Level. (See Table 9 above). As is usual in this examination, candidates performed better in the project and skills test components than in the written examination and this assisted them in achieving a better overall result.

It is noteworthy that in 2000, 2.6% of candidates achieved an A grade and 13.8% a B grade, compared with 5.6% and 18.9% respectively in 2005. Examiners have commented that the recent introduction of sketches as visual aids to the text has helped candidates understand what was required and that this has led to an improvement in candidate performance in the written component. However, there is a marked similarity in the grade distribution over the past three years at this level.

3.3 Analysis of Candidate Performance

General observations

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

The 2005 examination paper covered a wide range of topics and aimed to allow Ordinary Level candidates show a wide range of knowledge. Candidates were well rewarded for all attempts presented and the results are in line with those of previous years. Question 1 proved difficult for some candidates but the marking scheme credited candidates with marks for all details that were correct. Candidates are advised to use sketches to convey information on technical detailing and candidates are rewarded for the quality of freehand sketching. Candidates are further advised to attempt the required four questions and thus maximise their chances of doing well in this component.

The following observations are based on a random sample of 240 scripts in the written examination.

Question 1. – Section through internal block wall, door and frame

This question is compulsory and was completed by 85% 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 an entry point to the question. However, some candidates confused internal block wall and external cavity wall, with many giving the details of the external cavity wall. Some candidates did not use the correct scale, used no scale or a 1:10 scale.

Question 2. – Timber stud partition with plasterboard finish

This was the least frequently attempted question. However, most of the candidates who did attempt this question were able to demonstrate an understanding of the structure of a stud partition and generally scored well. Many candidates had difficulty in showing a second method of providing a finish to the plasterboard. The average mark achieved was 28.

Question 3. – Plumbing to a to a kitchen sink

As in previous years the plumbing question was a popular question and it was generally well answered. Almost 50% of the sample attempted this question, making it the 3rd most popular question on the paper. Many candidates found part (b) - prevention of odours from entering the kitchen - challenging and some candidates omitted it. Where this part was attempted, candidates offered a wide range of possible solutions and were duly credited.

Question 4. – Flat roof construction for an extension

This was not a frequently attempted question. However, the question was generally well answered by the candidates who attempted it. Ventilation of roof space as a design detail was in most cases shown correctly. Some candidates showed a pitched roof. However, candidates were credited with marks where the detailing presented was correct. The average mark achieved was 32.

Question 5. – Safety

With the exception of Question 1 which is compulsory, this was the most popular question, with over 80% of the sample attempting it. The answering was generally good, with candidates showing a sound knowledge of safety in the construction industry. Some candidates did not give reasons for each precaution as required, but instead gave one overall reason at the end and as a result lost marks. The average mark achieved was 36.

Question 6. – Two-pipe central heating

This was a popular question with almost 75% of the sample attempting it. Candidates showed a good knowledge of central heating systems. Some candidates confused the pipe systems and connections to radiators. Parts (a) and (b) were well answered but many candidates had difficulty in sketching a valve in part (c). The average mark achieved was 32.

Question 7. – Building details and terminology

Though not a popular question this year, it was well answered by those who attempted it. In some instances candidates confused reinforcing mesh with the mesh used in plastering. The average mark achieved was 30.

Question 8. – Planning permission

This was a popular question, attempted by about 75% of the sample. Candidates displayed a very good understanding of part (a). However part (b), which required details of full planning permission, was not very well explained. Part (c) relating to planning documentation, was well answered. The average mark achieved was 31.

Question 9. – Thermal insulation in domestic dwellings

This proved to be a very popular question and demonstrated candidates' interest in conserving heat in our buildings. Candidates showed a good understanding of the principles of insulation. Almost all candidates were able to name two insulating materials. The attic and external wall were the favoured locations for insulation. The average mark achieved was 33.

3.4 Conclusions

- Candidates selected a wide range of questions. The question on safety was the most frequently attempted optional question and was very well answered.

- Questions on topical issues such as insulation of buildings and planning permission were also well answered and are obviously relevant to the candidates.

- Freehand sketching, which is an essential skill, was generally not sufficiently used by candidates.

- Many candidates who did not do well in this examination had not attempted the required four questions.

3.5 Recommendations to Teachers and Candidates

It is recommended that teachers:

- advise candidates to attempt all four questions

- practise freehand sketching with their students.

It is recommended that candidates:

- read all the examination questions carefully at the beginning of the examination

- 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 and thus gain the marks that are allocated for clear, well drawn, labelled diagrams.

4. Written Examination - Higher Level

4.1 Introduction

A total of 6719 candidates sat the examination in Construction Studies at Higher Level in 2005, representing 74.5% of the total cohort. A total of 419 of these candidates were female, representing 6.2% of candidates at Higher Level.

4.2 Performance of Candidates – Higher Level, Written Examination 2005

The accompanying table and graph show the overall distribution of grades for the Higher Level written examination for the years 2003 to 2005. The final results for 2005 accord closely with those of previous years.

Table 15: Percentage of candidates achieving each grade in the written examination - 2005

	A	B	C	ABC	D	E	F	NG	EFNG
2003	5.0	19.9	30.5	55.4	27.5	12.7	3.9	0.5	17.1
2004	5.4	19.4	29.3	54.1	26.8	13.5	4.9	0.7	19.1
2005	6.0	20.2	29.3	55.5	25.5	13.4	5.1	0.5	19.0

Note*: The grades here are indicative only. The grades awarded to candidates in Construction Studies are computed from the combined results of the relevant components completed by candidates*

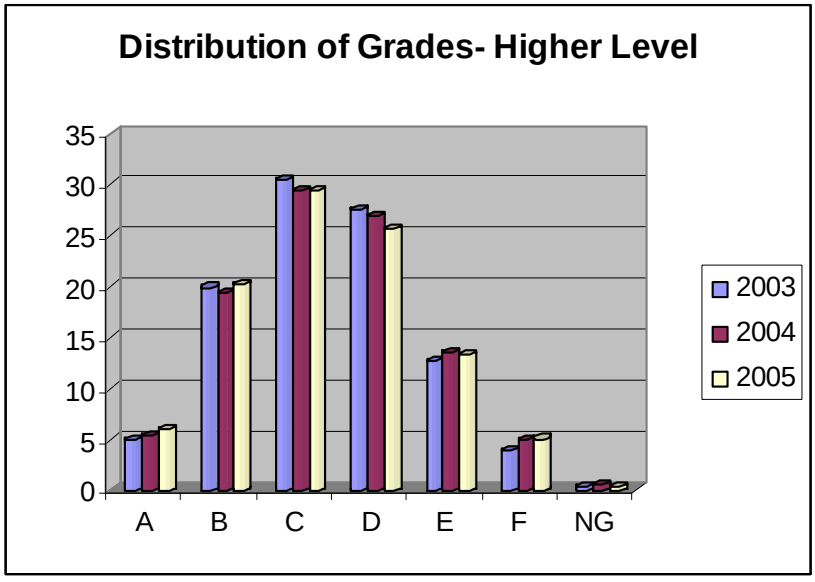


Table 16: Distribution of grades written examination – Higher Level 2003- 2005

As can be seen from the above tables, there is very little overall variation in the distribution of grades across the three years at Higher Level. While the A+B+C grades remain almost constant, there has been an increase in the percentage of candidates obtaining an A and B grade and a consequent decrease in the percentage of candidates obtaining a D grade. Noting the high percentage of the candidates who failed to obtain a D grade in the written paper, candidates are

advised to establish a more balanced distribution of their time between written and project components.

Almost 1 in 5 (19%) candidates did not achieve a D grade in the written examination at Higher Level in 2005. However, only 2.2 % did not achieve a D grade overall, (Table 11). Clearly, there is a disproportionate reliance by candidates on the project and skills test components to enhance their overall grade. A more balanced performance across all three components would be more satisfactory conclusion

4.3 Analysis of Candidate Performance – Higher Level, Written Examination - 2005

The written paper offered candidates a wide choice of questions on a variety of topics relating to building, architecture, heritage and town planning. Some candidates were very well prepared for this examination 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. 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 for this component. The marking scheme indicates the marks awarded for the sketching component.

It is recommended that candidates pay more attention to the development of freehand sketching techniques to enable them to convey information using 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 and that candidates should plan their time to ensure that they spend adequate time studying the written examination.

The following observations are based on a random sample of 800 scripts in the theory examination.

Question 1. – Ventilation of concrete and adjoining suspended timber floors

This question is compulsory and part (a), requiring sections through solid and suspended floors, provided an entry point for most candidates and was generally well answered. Candidates demonstrated a sound knowledge of the foundation and floor detailing and were generally competent in the production of scale drawings. Part (b), requiring design detailing for ventilation of the suspended floor, proved difficult for many candidates and only a small number of candidates completed this detail successfully. The average mark achieve was 36.

Question 2. – Accessibility for a person with a disability

Excepting Question 1, which is compulsory, this was the most popular question and was attempted by 85% of the sample. In the main this question was answered competently, with candidates showing a sound knowledge of the design details necessary to accommodate wheelchair access. The average mark was 35. A small number of candidates repeated the information provided in part (a) again in part (b). Some candidates found part (b), which required specific knowledge of the design detailing for wheelchair access, more testing and some candidates experienced difficulty in providing the specific design detailing and measurements needed to obtain the highest marks.

Question 3. – Bedroom accommodation in an attic space

This was not a popular question and was answered by 35% of the sample. Part (a), which required the design detailing to accommodate bedrooms in the attic space, was generally well answered. There were some good sketches, demonstrating a good knowledge of roof construction. Section (b) was more challenging and required candidates to suggest options to provide natural lighting to the attic space. Many candidates gave one method of lighting but were unable to identify how the method suggested respected the character of the house.

Question 4. – Design detailing for load bearing and non-load bearing stud partitions

This was not a popular question and was answered by 28% of the sample. It was generally not well answered, with many candidates showing poor understanding of the different design detailing for a load bearing and a non-load bearing partition. Many candidates who understood the principle of transferring the loads to foundations were unable to provide the required design detailing. Part (b), which was attempted by less than half the candidates who attempted this question, was generally well answered. Candidates understood the principles of sound-proofing partitions and the sketching was generally good.

Question 5. – U-value and principles of roof design

This is a popular question, with 65% of the sample attempting it. Many candidates were well prepared for this question. The vast majority of candidates calculated the U-value of the roof with the minimum of error but very few proceeded to determine the overall heat loss. Part (b), which required an understanding of the principles of roof design, was generally not well answered and candidates proposed a variety of solutions, but many of them were not fully realised. Sketching was of mixed quality and many answers were not extensive enough or well thought out enough to obtain maximum marks. The average mark attained was 32.

Question 6. – Plumbing and Cold Water Supply

This question was not a popular question, with only 29% of the sample attempting it. It was generally not well answered. Parts (a) required standard plumbing detailing and this part of the question was generally well answered. However, part (b), which required the correct positioning of the valves, proved difficult for many candidates. Part (c), requiring design detailing to prevent tank overflow was not well answered. Almost all candidates provided an overflow pipe but the precise design and functioning of the ball valve was not well understood and sketches of this valve were generally poor. The average mark attained was 29.

Question 7. – Casement Window

This was a popular question, attempted by 60% of the sample, and was the best answered question with an average mark of 40. The standard section through the casement window, the lintels /DPC and the concrete sill was well answered. Most candidates were competent in the production of a scaled drawing showing the required details. Part (b) was generally not very well answered, with many candidates suggesting that condensation occurred on the inside surfaces of the glass. The thermal bridge effect was not generally well understood, with many candidates suggesting that the damp proof course prevents condensation.

Question 8. – Backdrop manhole

This question was the least popular question, attempted by 16% of the sample. It was also the least well answered question – the average mark attained was 15. Part (a), was generally well answered and most candidates suggested three design considerations for a sewage system. Many candidates made a poor attempt at part (b) and the principle of a backdrop manhole, fundamental to the understanding of sewage conveyance, was generally not well understood.

Question 9. – Timber frame construction

This proved to be a popular question, with almost one in two (46%) candidates attempting this question. Part (b) was well answered by most candidates and the majority demonstrated a sound knowledge of the advantages of timber frame and solid block construction. Part (a), which required a scale drawing showing foundation to cill details, was less well answered, especially the fire check at the window and the breather membrane detailing. Most candidates were competent in the production of a scaled drawing. The average mark attained was 28.

Question 10 (a). – Passive solar gain

This was generally a well-answered question and was attempted by 37% of the sample. Section (a) was well answered but answers were not very extensive or in depth. Section (b) was also well answered with many candidates providing good sketches and most candidates understanding the concept of correct orientation of the sunspace to maximize passive solar gain. In section (c) many candidates were able to give at least one good design consideration, usually the provision of insulation in the roof and walls or the provision of double-glazing.

The average mark attained was 37.

Question 10 (b). – Urban planning and sustainable development

Candidates who attempted this question clearly had an interest in issues relating to sustainable development and town planning. A careful reading of the question was required in order to answer each point raised in the quotation. Candidates were assessed on the quality of arguments presented and on their abilities to present and develop their own ideas and draw appropriate conclusions. Although not widely attempted, many candidates answered very well and scored high marks in this question. A small number of candidates who attempted this question demonstrated little understanding of the issues involved in sustainable development. Such candidates did not present the detail required and consequently could not achieve high marks.

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.

- 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 to Teachers and Candidates

It is recommended that teachers:

- ensure that an adequate balance is achieved between the theoretical and practical components of the course

- emphasise the importance of high quality sketches as a means of communicating detailing

It is recommended that candidates:

- 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 should plan their time to ensure that they spend adequate time studying for the written examination.

5. The Skills Test

5.1 Introduction

The Skills Test consists of interpreting a drawing, marking out, processing and assembling an artefact to a given specification according to the drawing supplied by the SEC. This examination, which is of 4 hours duration, takes place in schools in May and is marked in Athlone by examiners appointed by the SEC. The Skills Test is offered at a common level only.

5.2 Performance of Candidates

The accompanying table and graph show the percentage of candidates achieving each grade in the Skills Test for the years 2003 to 2005. The final results achieved in 2005 accord closely with those of previous years.

Table17: Percentage of candidates achieving each grade in the skills test 2003 - 2005

	A	B	C	ABC	D	E	F	NG	EFNG
2003	20.4	42.3	25.5	88.2	9.8	1.6	0.3	0.0	2.0
2004	20.0	41.9	25.0	86.9	9.8	2.5	0.6	0.1	3.2
2005	21.2	39.5	26.3	87.0	9.7	2.6	0.6	0.1	3.3

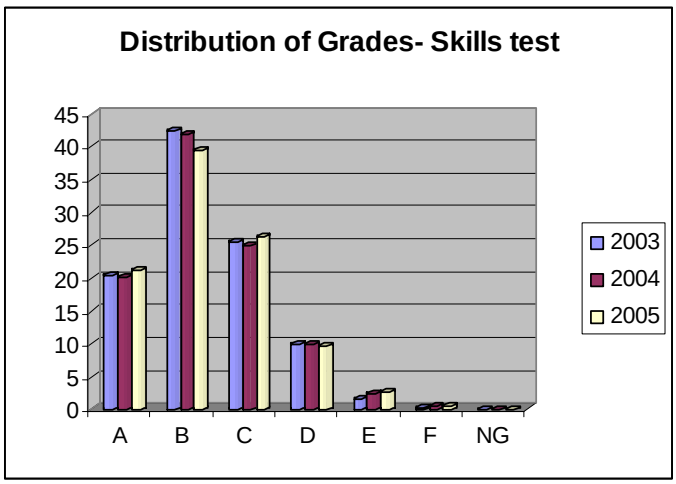
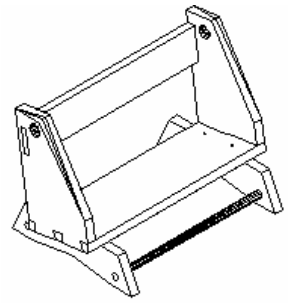


Table 18: Grade distribution for skills test 2003 - 2005

The results for 2005 are broadly in line with those of 2004, showing an increase of 1.2% in the A grades and a decrease of 2.4% in the B grades from 2004. A total of 87% of candidates achieved a C grade or higher, compared with 86.9% in 2004, indicating a competent performance in this test. Only 3.3% of candidates failed to achieve a D grade, indicating that 96.7% of candidates achieved a D grade or higher in 2005.

5.3 Analysis of Candidate Performance

Interpretation of Drawing



The vast majority of candidates had little difficulty in the interpretation of the given drawings. The pictorial view of the assembled artefact and a pictorial exploded view assisted candidates with the interpretation of the orthographic detailing.

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 of the dovetails. Candidates who had not prepared such a template in advance lost time during the examination in setting the bevel to the correct slope. Candidates should read the equipment list carefully and ensure that they have all the specified equipment.

Marking out

The vast majority of candidates succeeded in assembling the artefact. A small number of candidates did not succeed in assembling the artefact and it was clear that these candidates did not approach the setting out process in a structured way. Many candidates marked out just one piece 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 at the beginning and to check the marking out for accuracy prior to commencing the processing. When all the marking out is complete, candidates can then proceed unhindered 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.

Dovetails

Most candidates showed considerable skill in the marking out, cutting and assembly of the dovetails, with some candidates demonstrating 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 should ensure that an adequate time provision is made for teaching and learning 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.

Processing

This work was generally of a good standard. Some candidates did not plane the sloping sides and finished to a rough saw finish. This resulted in a loss of marks under the heading "Overall Assembly".

Design Feature

To allow for individual expression, candidates are required to apply a design to the edges. Some candidates excelled in this area and applied unique and individual designs. However, many candidates did not apply a design feature to the edges as required and consequently lost marks for this component.

The overall standard of craftwork was very 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.

5.4 Monitoring of Examination Centres

As with written examination, the State Examination Commission (SEC) monitors the practical examinations to ensure that the requirements of the Commission are complied with. Examination and Assessment Managers (EAMs) of the SEC monitored a total of sixty three examination centres for the practical examinations in Construction Studies in 2005.

The EAMs reported that the vast majority of centres were prepared as required and that the requirements of the SEC were being fulfilled. In only two centres were further enquiries necessary to ensure that all requirements were being observed and to ensure that the principle of inter-candidate equity was being upheld. The following is a summary of the findings and observations made by EAMs following the 2005 monitoring process:

- most centres were properly laid out with special tools provided on dedicated benches
- all centres were run in an orderly manner
- teachers were available on an on-call basis though not necessarily present in the centres
- while additional pieces were stored in the centre during the examination, there was no evidence of these pieces being used by candidates during the examination
- the examination papers were stored in a secure location under lock and key in all schools
- all examination papers, with the exception of one examination paper in one centre, were collected and stored securely, as required

Role of the teacher

Circular S46/05 outlines the role of the teacher of Constructions Studies during the practical examination. Circular S46/05 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 all centres monitored, EAMs reported that teachers of Construction Studies had scrupulously observed these guidelines. The SEC acknowledges the co-operation of the teachers of Construction Studies in assisting with the preparation the examination centres and in ensuring the smooth running of the examination.

Use of Additional Materials

Candidates are required to process the artefact from the materials list issued to schools in advance of the examination. The use of extra or replacement pieces is expressly forbidden in the Instructions to Candidates. To uphold the principle of inter-candidate equity, teachers are advised to make sure that no spare pieces are available to candidates during the examination. While spare material was observed in a small number of centres, EAMs reported that these were not being used by candidates as examination material and teachers stated that these materials were for later sessions of the examination.

Use of machinery

With the exception of a battery-operated screwdriver, the use of machinery is expressly forbidden during the examination. The artefact is to be hand produced by candidates without the assistance of machinery and the artefact should demonstrate the processing skills necessary to achieve this objective. The Instructions to Candidates state that *"Use of machinery is not allowed"*. These instructions are issued in poster form to schools and are issued to each candidate on the day of the test. In accordance with current practice and clearly outlined on the published marking scheme, marks are deducted where there is evidence of the use of machinery. There was no evidence of inappropriate use of machinery in the centres monitored by EAMs in 2005.

5.5 Conclusions

- Candidates were generally well prepared for this practical examination 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 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 of the school authorities in the preparation of the centres and in facilitating the smooth running of this examination.

5.6 Recommendations to Teachers and Candidates

It is recommended that teachers:

- 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.

- remind candidates of the penalty that applies where machinery is used to process materials during the examination

- ensure that candidates have only the materials specified in the cutting list and do not have access to extra or replacement pieces during the examination.

- ensure that an adequate time provision is made for teaching and learning the skills associated with the Skills Test.

It is recommended that candidates:

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

- process the marking out of all the pieces as one sequence of operations at the beginning and to check the marking out for accuracy prior to commencing the processing.

- use only the materials specified on the materials list

6. Project work

6.1 Introduction

The syllabus stipulates what constitutes valid project work for the purposes of final assessment:

(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)

To fulfil the requirements of the syllabus, therefore, a practical artefact must be supported by a folio/report and a Written/Drawn project must be supported by a practical artefact, which may consist of a scale model or detail from the subject under investigation. Thus, a Written/Drawn project on its own - folio only - or a practical artefact on its own – unsupported by a written folio/report - does not meet the requirements of the syllabus.

The project, which is examined at common level, is 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 project work at national level they may not have the overview necessary to determine a national standard. Consequently, the marks awarded by the class teacher are moderated in the schools by Examiners, who are appointed and trained by the SEC. This moderation ensures a national standard and consistency of the marking process. The work of each Examiner is monitored by an Advising Examiner during the moderating process in order to ensure inter-rater reliability. A very high national consistency was reported (98.4%) between the marking of the Examiner and that of the Advising Examiner for the monitoring of project work in 2005.

In 2005, the moderation process was conducted over a two week period in a total of 446 Centres.

Examiners noted that in some centres teachers and candidates put considerable effort into the preparation of the display, in neat and ordered classrooms. Some centres provided dedicated display stands to enhance presentation. Such an effort is to be commended as it values the effort of the candidates and offers a showcase within the school for the creativity and skills of the candidates. In a small number of centres, projects were presented in an untidy and cluttered manner.

6.2 Performance of Candidate

The accompanying table and graph show the overall distribution of grades for the project work for the years 2003 to 2005. The final results accord for 2005 closely with those of previous years.

	A	B	C	ABC	D	E	F	NG	EFNG
2003	30.5	36.2	19.7	86.4	9.4	3.1	0.9	0.1	4.1
2004	26.4	38.2	21.5	86.1	9.6	3.3	0.9	0.1	4.3
2005	26.7	38.9	21.1	86.7	9.0	3.5	0.7	0.1	4.2

Table 19: Candidate performance project 2003-2005

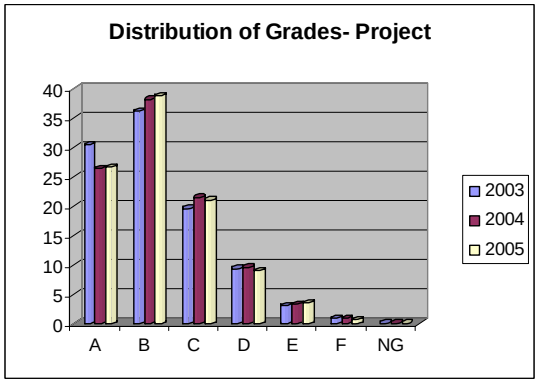


Table 20: Candidate performance project 2003-2005

The grade profile for the Project work for 2005 is almost identical to that of 2004, the A grade shows a slight increase of 0.3% from 2004.

The A+B+C grades remained almost the same - 86.1% in 2004 and 86.7% in 2005.

The percentage of candidates not achieving a D grade remains constant over the three years - at 4.1% in 2003, 4.3% in 2004 and 4.2% in 2005. The overall grade distribution follows closely the pattern of previous years.

Table 21 shows that there is a close correlation between the performance of candidates in both the project and the practical test. Such a correlation does not exist between candidate performance in the written examination and either of the other two components. In the written examination, at higher level, 6.0% of candidates achieved an A grade and 19.0% failed to achieve a D grade. In the project component, 26.7% of candidates achieved an A grade and 4.2% of candidates failed to achieve a D grade.

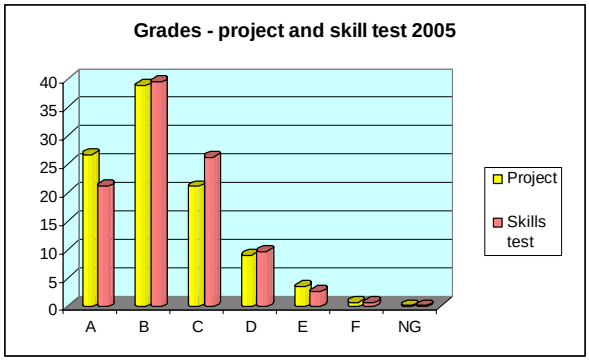


Table 21: Grade distribution for project and skills test 2005

6.3 Analysis of Candidate Performance

In analysing candidates' responses some generic points emerged. These are set out below under the following headings for the project work:

Diversity of Project Work

The Leaving Certificate Construction Studies syllabus is not prescriptive regarding the type of project work to be presented. The syllabus details areas from which project may be chosen and lists the following project areas:

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

The above list, as outlined in the syllabus, provides a rich and diverse range of areas from which candidates may choose a project. However, the popularity of furniture type projects at Leaving Certificate level has continued to increase since the introduction of project work in Materials Technology Wood at junior cycle, resulting in a reduction in the range and type of project work presented for assessment.

As can be seen from the accompanying pie chart (table 22), furniture remains the most frequent type of project presented (70.1%) for assessment in 2005. Project work involving new technology applications is the least frequently attempted (0.5%). Heritage type projects represented only 6.3% of all project work submitted in 2005.

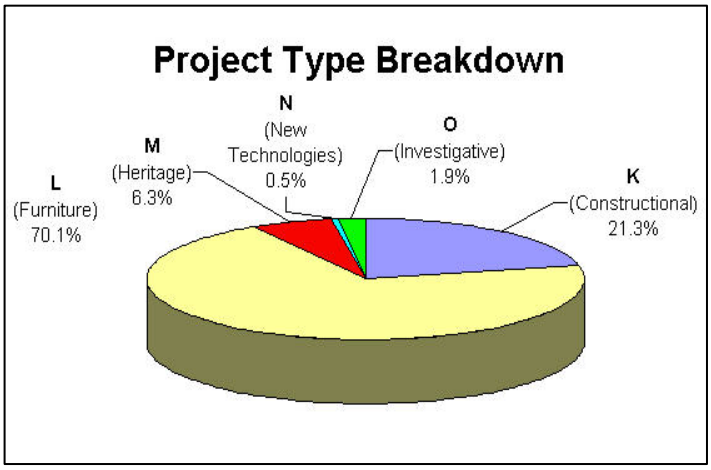


Table 22: Pie chart showing project type undertaken in 2005

Many teachers and candidates choose furniture type projects and, where properly executed, these provide opportunities for a high level of design and make skills. However, an exclusive concentration on furniture type projects in a particular school narrows the choice of project work available to candidates, with a consequent narrowing of the range of learning opportunities. Furniture type projects are often limited in focus and do not complement the broader aspect of the syllabus, designed to inform candidates about the broader issues associated with buildings and the built environment. Teachers should encourage candidates to explore a wide variety of themes

before they decide on a particular project type. Teachers should help make candidates aware of the rich architectural heritage of the country and 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 project work. 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 final year project.

Investigation and Research

The higher order skills of investigation, research and evaluation are essential elements in project work, particularly at Higher Level. Many of the furniture type projects 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 of Higher Level candidates. It is recommended that teachers encourage students to undertake a wide range of project types and, in so doing, provide opportunities for the development of the full range of investigative and research skills provided for in the syllabus.

Candidates are increasingly using the Internet as a research tool and such a practice is commended. However, candidates are advised to record in the portfolio a list of all the websites used and detail the information obtained. Some candidates present information from the Internet as their own work. Such practice is not acceptable, and where such work is presented it will not be credited with any marks. Where candidates use information sourced from the Internet, this should be clearly indicated and candidates will be credited for such research. Teachers should advise candidates to record in the portfolio the sources of all information, especially information sourced from the Internet.

The Portfolio / Report

The portfolio records the work of the candidate and should contain all the details of the project work from the initial ideas to the final evaluation and conclusions. Sketches, photographs and written descriptions of work in progress all form a vital part of the record and ensure that examiners can readily verify from the portfolio that all the work submitted for assessment is the individual work of the candidate.

In many instances, the quality of the portfolios submitted was very high 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 a significant amount of 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.

Candidates are advised to develop their folio in tandem with the artefact so that the folio contains a contemporaneous record of progress. The folio should include a coherent record of analysis, background research, final conclusions and overall evaluation. It is recommended that candidates make use of digital media to capture and record the on-going development of the artefact.

Candidates are also advised, as reflective learners, to draw conclusions form the practical experience involved in project work and to include this reflection in the folio.

The portfolio provides an ideal opportunity for the integration of ICT. Many candidates integrate ICT very successfully into the portfolio/report and this is to be commended. Many candidates include digital images as an ongoing record of work in progress, some candidates include drawing in 2D and 3D CAD, and a significant number of candidates provide typed folios. Teachers are to be commended for leading this development.

Sketching

The ability to convey information by means of freehand sketches is an essential competence in the study of Construction Studies. Well executed and properly proportioned freehand sketches convey information that is difficult to convey in words. In many instances the quality of sketches presented in the folio in 2005 was disappointing. Sketches should be shaded, rendered and coloured, as appropriate. Particular emphasis should be placed on the development of freehand sketching. The facility to produce competent freehand sketches takes time and practice to develop. Teachers should encourage candidates to keep a dedicated sketchpad in which candidates record by means of sketches architectural details and buildings of interest in the locality. Such a sketchpad would assist candidates in practising sketching techniques and also help raise visual awareness and make them more observant of buildings and the built environment.

Candidates are rewarded when design ideas and detailing are cogently expressed in the portfolio/report and in the written paper with the aid of competently executed freehand sketches.

Experimental work

The syllabus states that candidates are required, as part of their study of the subject, to undertake "*experiments which are assigned and closely supervised by the teacher*". Candidates are to record in the portfolio, descriptions and results of experimental work undertaken during the course of study. Candidates are advised to relate the experimental work to some aspect of the project work undertaken. This provides candidates with an opportunity to hypothesise and to analyse in detail aspects of the project work and to record the results of such analysis. It also provides candidates with an opportunity to undertake unique experimental work. Candidates who provide derivative experimental work cannot achieve the full compliment of marks. Furthermore, it is recommended that **three** experiments be undertaken and recorded for assessment by each candidate.

Examiners reported an improvement in the approach of candidates to experimental work in 2005. Many candidates investigated aspects of the project, constructed a hypothesis, investigated this hypothesis and derived a conclusion. Such an approach is to be commended and candidates were rewarded accordingly.

6.4 Authenticity of Project Work

While project work has clear educational benefits, it carries some risks. Because project work is executed over an extended period of time, the possibilities for third party assistance, plagiarism and collusion are increased when compared with that of a terminal written examination. In order to protect the integrity of the examination and to uphold the principle of inter-candidate equity, the conditions for the acceptance of project work are specified in SEC Circulars S77/05 and S43/06 and also in the Instructions to Candidates which are issued to schools each year. These conditions include:

- The project must be the candidate's own individual work
- It must be executed in school under the supervision of the class teacher
- The project must be negotiated with the class teacher, so that on completion the teacher can authenticate the project as the candidate's own individual work.

In the 2005 examination the vast majority of project work submitted by candidates was completed in accordance with the SEC'S regulations and duly authenticated by the class teacher and school authorities. However, in the case of 65 candidates (0.72%) further investigation was necessary to determine the authenticity of the work submitted. Penalties were applied where, on investigation, there was evidence that the work submitted was not solely the individual work of the candidate. The

penalties for non-compliance which were applied in 2005 included loss of the subject in its entirety and loss of marks for the project component.

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 project work submitted for assessment. In order that the teacher can authenticate and sign off on each project as the candidate's own individual work, the instructions require that the work takes place in school, under the direct supervision of the class teacher. For the purposes of assessment, the SEC does not accept the authentication of third parties. To guarantee inter-candidate equity, the teacher is required to ensure that no additional help is given to an individual candidate that is not available to the class group as a whole. During the project work teachers are engaged in ongoing dialogue with the candidate, supervise the ongoing work and are then in a position to authenticate legitimate project work. If teachers are unable to authenticate certain project work 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.

In order to facilitate compliance with regulations and authentication of project work, the following advice is offered to candidates and teachers:

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

- It is acknowledged that project work 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 also be obtained from others such as parents, guardians, siblings and friends. For instance, a parent/guardian discussing the project topic, reading and commenting on the portfolio and suggesting possible sources of data and information is seen as legitimate advice. In such a

situation the help is considered benign, reasonable and proper. However, there has to be a clear demarcation between such help and encouragement from a parent, guardian or friend and such a person doing all or part of the work for the candidate.

6.5 Conclusions

- In many instances candidates demonstrated a very high standard of practical skills in the projects they presented for examination. In a significant number of cases excellent practical skills were demonstrated.

- 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 a significant amount of 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.

- While it is obvious that many candidates commit considerable time and energy in the project and consequently achieve high grades as indicated, a preponderance of furniture type projects, such as was presented in 2006, limits the range of projects provided for in the syllabus and narrows the learning experience available to candidates.

- Some candidates manage their time poorly and thus spend an excessive amount of time on project work. Consequently, the time available for the study of the theory component is diminished and this is reflected in candidate performance in the theory component. The management of project work provides an ideal opportunity for learning time management skills.

- In many instances the quality of sketches presented in the folio in 2005 was disappointing.

- Many of the furniture type projects 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 of Higher Level candidates.

6.6 Recommendations to Teachers and Candidates

It is recommended that teachers:

- ensure that a balanced time provision is made available for all three components of the course, practical , written and project

- encourage students to plan their work in advance and to devise a project management log or Gantt chart to help them set targets and thus help optimise the use of time spend on project work

- encourage students to explore a wide variety of themes before they decide on a particular project type.

- direct students' attention of the rich architectural heritage of the 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 project types. A wider range of project work would provide candidates with greater opportunities for investigation and research and would also assist candidates in preparation for the written examination

- encourage students to develop the range of investigative and research skills provided for in the syllabus

- 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 project work 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 candidates complete and sign the necessary documentation prior to leaving the school

- display project work in a secure and uncluttered classroom. Project work should be arranged in ascending numerical order and no other project work should be displayed in the Centre. Where a number of teachers are teaching different class groups in the same school, the work of the candidates should be arranged according to the class group of the teacher.

- encourage candidates to practise sketching techniques over the duration of the course. Marks are awarded for sketching in the folio and in the written paper and candidates are rewarded where they produce neat well proportioned sketches to convey technical detailing.

It is recommended that candidates:

- read the Instructions to Candidates issued by the Commission and follow these Instructions in the research and execution of their project work

- plan their time management carefully and not spend an excessive amount of time on project work, at the expense of the theory component

- keep a project management log or Gantt chart detailing targets dates set for project work 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 work-in-progress

- integrate ICT into the folio using digital media to record the on-going development of the artefact and pay particular emphasis on the quality of freehand sketching in the portfolio

- record in the portfolio a list of the websites used and record the details the information sourced from the Internet

- record all sources of information used in researching the project work

- carry out **three** experiments related to some aspect of the project work undertaken and record in the folio the procedures followed and results obtained for each of the experiments

- pay more attention to the development of 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, synthesis, design and evaluation are demonstrated in the folio and that a personal reflection on the process is also included in the folio

- display the completed project work – artefact and folio - in a neat and attractive manner.

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