

**UNIVERSITY OF DUBLIN
TRINITY COLLEGE**



**PROVOST'S REPORT TO COUNCIL ON
THE REVIEW OF THE DEPARTMENT OF CIVIL, STRUCTURAL AND ENVIRONMENTAL
ENGINEERING**

1. INTRODUCTION

This report presents the outcome of a departmental review of Civil, Structural and Environmental Engineering. An external peer review visitation was undertaken on the 7th and 8th of December, 2004 by Professor David Anderson, University of Warwick, and Professor Roger Frank, Ecole Nationale des Ponts et Chaussées (France). The internal member of the review team was Professor Clive Williams, Biochemistry Department.

The report is based on (i) feedback from the external Reviewers received on the 13th February 2005, (ii) a submission from the Dean of Engineering and Systems Sciences received on the 29th April 2005 and (iii) a submission from the Department of Civil, Structural and Environmental Engineering received on the 21st April 2005.

The main purpose of the departmental review is (a) to provide a structured opportunity for the Department to reflect on its activities and plans for development, while benefiting from a constructive commentary by senior colleagues external to College; (b) to ensure that quality and standards in teaching, research and administration are being maintained and enhanced; and (c) to ensure that areas of concern in this regard are identified and addressed within an eighteen month timescale. This review process ensures that each academic department in College is reviewed systematically once every five years. The review of the Department of Civil, Structural and Environmental Engineering is the last in the current review cycle.

2. OVERVIEW OF THE DEPARTMENT

2.1 Aims and Objectives of the Department

The aims and objectives of the Department are:

- to produce high calibre engineers
- to adopt a research-led approach to teaching at undergraduate and postgraduate levels
- to promote amongst its staff and postgraduate students the highest level of excellence in research and scholarship to the best international standards
- to contribute to the 'College experience' for students, to assist in their welfare and to contribute to the planning, organisation and management of College and, where possible, to contribute financially
- to contribute to the profession both nationally and internationally and to enhance its public profile with appropriate publications
- to operate as a national and international resource in the provision of expert advice.

2.2 Programmes to which the Department provides teaching

Undergraduate

- Four-year full-time Civil Engineering degree programme leading to the BA, BAI degrees.

Postgraduate

- One-year full-time or two-year part-time taught MSc programme in Civil Engineering with specialisations in Transportation Engineering and Environmental Engineering
- One-year part-time postgraduate diploma programmes in:
 - Applied Building Repair and Conservation
 - Construction Law and Contract Administration
 - Environmental Engineering
 - Fire Safety Practice
 - Highway and Geotechnical Engineering
 - Physical Planning
 - Project Management.

2.3 Research

The Department is involved in research in four main areas:

- Structures
- Geotechnics
- Transportation
- Environment.

2.4 Summary Statistical Profile of the Department for the Academic Year 2003 - 2004¹

Full-time Staff FTE	Undergraduate FTE	Postgraduate FTE	Department Staff:Student Ratio	Faculty Staff:Student
18.16	225.50	130.75	20	16

¹ Figures from Senior Lecturer's Annual Report approved by Council at its meeting on 1st December 2004.

2.5 Accommodation and Facilities (Physical Resources)

The Department is the sole occupier of the Simon Perry Building and the Old Civil Engineering Laboratory Building, which are adjacent (and connected) to each other. The Department shares the Museum Building with the Departments of Geography and Geology. The Civil Engineering Library is located in the Museum Building and one postgraduate research office is located in 193 Pearse St.

3. EXTERNAL PEER REVIEW REPORT

SUMMARY OF REPORT

The overall impression of the Reviewers *“is that all the staff of the Department of Civil, Structural and Environmental Engineering are committed to excellence in the many aspects of their work...and very committed to teaching, research, and the Department’s role in society at large.”*

The Reviewers begin their report by saying that they spent much of their time during the review visit considering strategic issues, which they believed would be *“helpful to the Department and to*

College". They report that the Department is very conscious of the role it plays in society and the country and find *"the Department's aspirations in teaching and industrial engagement to be already met"*. Much of their visit, they say, concerned *"how the Department's already extensive research could be enhanced further at European and international level within the limits resulting from the College's financial restrictions"*. They report that they found it most helpful to have an internal member of the College staff on the review team and they recommend that this practice continues.

TEACHING

The Reviewers comment that *"the attractiveness of civil engineering as a course and the programme at Trinity have both resulted in many students electing to specialise in this discipline"*. However, the large numbers of students choosing to study civil engineering inevitably lessens the time that staff can devote to research. Students are given around 30 contact hours each week, which the Reviewers feel is too high. They feel that the *"support provided by technical staff...is excellent"* and while they commend the commitment of staff to teaching and support for student learning, they note a number of concerns expressed by students including poor feedback on laboratory reports, scheduling of laboratory work, difficulties in accessing lecturers and failure of the Department to follow up on student feedback following the submission of questionnaires. The Reviewers feel that these concerns are directly related to *"the great quantity of work the academic staff are already committed to"*, and recommend that the Department review its teaching provision with a view to improving the efficiency with which it can deliver the undergraduate programme and support its students.

At M.Sc. level, the Reviewers suggest that the Department should consider developing other specialised M.Sc. programmes, *"providing they can generate a substantial income for direct use by the Department"*. They congratulate the Department on its extensive range of Diploma courses, which are *"highly valued by participants and employers"*. They recommend that the provision of diploma courses be continued, as the deep knowledge obtained through these courses *"will strengthen the ability of the industry to compete internationally"*. They feel that the diploma courses *"show the Department as a centre of expertise in their respective areas"* and recommend that *"the Department exploit this reputation in seeking funding for complementary research"*.

RESEARCH

The Reviewers outline the College's four major research themes and note that much of the research carried out in Civil Engineering relates to these themes. They comment that *"College particularly wishes to support interdisciplinary research"* and that *"this breadth is present in research in civil engineering"*. They feel that interdisciplinary research will be further encouraged if Engineering were to be reorganised as a broad School.

The Reviewers support the Department's short-term plans to create more time for staff *"for reading and personal development, to identify appropriate topics, attract funding, recruit and supervise students and research staff and to publish"* by *"minimising administrative roles, encouraging a more strategic view on contributions to College and society and making maximum use of College support services"*.

The Reviewers note that the research plans of academic staff address problems of national, European and international concern *"which by their nature are more likely to attract research funding"* and they recommend that priority be given to these topics. In making this recommendation, the Reviewers point out that they do not wish to exclude fundamental research, but suggest that a balance be struck which is *"informed by knowledge of possible sources of funding available to universities in the Republic of Ireland"*

They congratulate the Department on the increase in the number of research students in recent years and recommend that it “*seeks to increase the number of international students who bring sponsorship with them*” by “*capitalising on its use of English as a working language and on the neutrality and the standing of the Republic of Ireland in international affairs*”. They suggest that such a promotion would be most effective if it were to be “*led by the College, by a consortium of universities from the Republic of Ireland or by a government agency*”. The research students interviewed were all appreciative of the access they have to their supervisors and of the “*good atmosphere within the Department.*”

The Reviewers note that the Department’s research success has been achieved without the benefit of a Chair of Civil Engineering and attribute this to the work of the “*Department as a whole and to its present leadership*”. They outline the importance of the Chair (i) to the status of the Department and its ability to attract national and international funding; (ii) in the strategic leadership of staff; and (iii) in enhancing the international reputation of civil engineering at Trinity through the personal research of the appointed Chairholder. They suggest that in advertising the position, the Department should consider the areas of civil engineering that are most likely to attract significant funding and highlight these areas as “*those from which an appointment is most likely to be made*”. They also recommend that the duties of the Chair be organised so as to allow the Chairholder to be research-active.

The Reviewers welcome the recent emphasis on the production of journal papers rather than conference papers, commenting that journal papers are more useful in terms of esteem and impact. They note that members of staff publish in national journals and at local conferences and they recommend that this should continue as “*such contributions are in the national interest*”, and that these local contributions “*should be recognised by College in promotion criteria*”. The Reviewers also point out that publication in national journals and conferences publicises and enhances the work of the Department to national sponsors.

RESOURCES

The Reviewers recognise that both the College and the Department have faced cutbacks in public funding but note that “*the Department is able to supplement its income through its Diploma courses*”. They feel that the income from these courses should be directed to investment in staff, research assistants and postgraduate students, and to increasing the number of administrators/executive officers in the Department to relieve the academic staff of non-academic tasks.

The Reviewers support the introduction of a new resource allocation model for the College and note that since most academic staff enjoy security of employment that “*duties should be fairly shared and that staff be redeployed where needed*”. They feel that this can most easily be undertaken if the engineering disciplines are combined in a School.

The Reviewers understand that College would permit the position of Chair to be filled, “*on the basis that the post held in lieu of the Chair be abolished and, because of the constraints arising from the present allocation of resources, a vacant permanent lectureship not be re-filled*”. They recommend that the Department use this opportunity to secure permission to fill the Chair and that if an internal applicant were to be appointed, that the Department be allowed to re-fill the vacant non-professorial post. They make a number of specific recommendations on filling the Chair, which are reproduced below.

ORGANISATION AND MANAGEMENT

The Reviewers commend the current leadership and recommend that under the College's new academic structure, a School of Engineering should be formed which would facilitate the deployment of staff to meet changing student demand and encourage interdisciplinary research.

The Reviewers note that many academic staff participate in activities related to the engineering profession and that some are involved in standards work. These activities contribute to College's strategic plan concerning contribution to society but can be very time consuming. The Department has proposed that a more strategic view be taken of such activities, particularly to free more time for research and the Reviewers recommended that this policy be followed. While they note the importance of allowing younger members of staff, particularly those from outside Ireland, to be involved with the engineering profession they say that "*such involvement needs to be undertaken with care to avoid becoming too costly in time*".

The Reviewers note that many academics undertake voluntary work on code committees for national standards organisations and recommend that the Department consider whether it can financially justify continuing this work on a voluntary basis.

RECOMMENDATIONS

The Reviewers recommendations are listed below.

Teaching:

It is recommended that:

- i) *the Department minimise administrative roles for staff members and review the extent of its teaching, particularly in terms of class contact with undergraduates, and review its undergraduate programme to reduce the resources needed to deliver this and compare the benefits of its teaching activity against costs*
- ii) *the Department benchmark its current provision against that of one or more other research-led universities providing four-year Bachelors' programmes in civil engineering*
- iii) *the courses in Environmental Engineering and Transportation continue as long as they are supported by active research groups within the Department*
- iv) *the Diploma courses be continued, and MSc courses possibly developed, and that the department be able to charge fee levels that reflect what the market will bear*
- v) *the Department develop a load model to estimate the total time needed to deliver teaching in all its aspects and research supervision*
- vi) *the Department seek and appoint former graduates to assist and lead teaching on a voluntary basis.*

Research:

It is recommended that:

- vii) *research plans give priority to topics that address problems of national, European and international concern for which research funding can be secured*
- viii) *the Department seek to increase the number of international students who bring sponsorship with them and identify countries in which it would be proactive in promoting opportunities for research and establish links with sponsoring organisations*
- ix) *the emphasis on publishing in journal papers continues*

- x) *the Department exploit its reputation as a centre of expertise in specific areas when seeking funding for complementary research.*

Resources/facilities:

It is recommended that:

- xii) *the Department consider whether the availability of funding justifies continued voluntary work on code committees or other industrial task groups*
- xiii) *income from the diploma and MSc courses be directed to investment in staff, research assistants and postgraduate students, to increase the department's research income and output*
- xiii) *the resource allocation model be introduced and that resources be re-directed from more favourably resourced subjects, including re-directing staff vacancies arising from resignations and retirements.*

Management/organisation:

It is recommended that:

- xiv) *the Department now be given permission to fill the Chair of Civil Engineering, and in filling the Chair, that the Department consider what areas of civil engineering would be most likely to attract candidates with ability to secure a high level of research funding and to enhance the international reputation of civil engineering at Trinity in a distinctive manner*
- xv) *if an internal applicant were to be appointed to the Chair, that College enable the Department to re-fill the non-professorial post being vacated*
- xvi) *College allow this temporary appointment of lecturer to be continued until the Chair is in post and has had time to consider the long-term staffing needs for civil engineering*
- xvii) *the new Faculty/School model results in a School of Engineering.*

4. RESPONSES FROM THE DEPARTMENT AND THE DEAN OF ENGINEERING AND SYSTEMS SCIENCE

The Dean of Engineering and Systems Science welcomes the Reviewers' Report as "*a very useful and encouraging contribution to the development of the Department of Civil Engineering*". He notes in particular the Reviewers' focus on strategic issues, which he feels are "*extremely opportune in the general context of the College's restructuring debate*" and notes that "*most if not all of the restructuring decisions taken by the Faculty have been in full accord with the Reviewers' recommendations*".

With regard to the role of the Department in promoting life-long learning and continuing professional development through their engagement with society at large, he notes that while the Reviewers endorse this engagement, they seem to suggest that "*the Department adopt a more judicious approach to the operation*" due to the high costs involved in terms of time demands. The Dean feels that such an approach could serve as a "*benchmark model*" for other Departments in the Faculty. The Department is pleased that the Reviewers are supportive of its strategy with regard to these activities.

The Dean and the Department highlight the filling of the Chair of Civil Engineering as being the single most important issue of concern for the Department and also of strategic importance to the Faculty and the College. The Dean expresses concern that four of the seven established Chairs in the Faculty of Engineering remain unfilled and suggests that the recommendation of the

Reviewers with regard to filling the Chair of Civil Engineering be “*acted upon without delay*”. The Head of Department requests that the College note the comment of the Reviewers that “*the present restriction on filling the Chair is damaging and certainly detracts from the Department’s ability to obtain national and international sponsorship*”. While the Department is anxious to fill the Chair, it strongly disagrees with the suggestion that the Department use the opportunity of sacrificing two permanent posts to fill the Chair of Civil Engineering.

Commenting on the Reviewers’ recommendation that in drawing up their criteria for filling the position the Department should concentrate on attracting candidates who can secure high levels of research funding, the Dean feels that “*a demonstrated ability to provide dynamic research leadership and to realise more fully the research potential of this Department would be even more important*”, and the Head of Department feels that “*excellence in research publication and a track record in fund generation are surely necessary pre-requisites for short-listing...and that the strongest candidates should be encouraged to apply, irrespective of sub-discipline.*”

The Dean endorses the Reviewers’ recommendations relating to the teaching load of the Department and suggests that “*a review of the overall teaching load on the engineering programme is appropriate not just for Civil Engineering but for all the Engineering Departments*”. With regard to the time devoted by the Department to activities related to the engineering profession, the Dean concurs with the Reviewers’ recommendation that “*a more strategic view*” of these activities be taken. The Head of Department also supports this recommendation and advises that the Department has “*set up a Task Group on curriculum development to review the syllabus of the sophister years*” and notes that this Group must “*re-evaluate both essential and non-essential activities to determine their worth and their benefit both academically and financially.*”

The Dean concludes by saying that with the formation of a new School of Engineering and the implementation of the resource allocation model “*there will be an opportunity for the Department to investigate and work towards re-balancing its commitments*” and that the person appointed as the new Chair will be crucial in driving this process.

Commenting on the recommendations related to research, the Head of Department notes that the Department staff are “*satisfied that our current Research Plan is appropriate*”, adding that “*in order to secure Fellowships and Associate Professorships in College...adequate time to conduct research in a suitable environment is the biggest issue and was substantially not addressed by the Reviewers.*” Furthermore the Head of Department does not feel that “*withdrawal from participation in code and industry committees should be contemplated as a response to poor government funding.*” He concludes by stating that the Review has been “*a most worthwhile exercise for us*” and that arising from it “*actions have already been taken to improve our standards and in making plans for the future*”.

5. RECOMMENDATIONS TO COUNCIL

It is recommended that the new School of Engineering address the detailed recommendations of the review report. The following recommendations are made to Council in light of the review report and the responses from the Dean of Engineering and Systems Sciences and the Department of Civil, Structural & Environmental Engineering:

- (a) the new School should:
 - 1. Respond to the recommendations in the report concerning research and publication strategy.

2. Enable an appropriate balance to be struck in the future between research commitments and output, excellence in teaching, pastoral care of students and involvement in professional and industry affairs.
 3. Review and make recommendations concerning fees for postgraduate taught courses and diplomas.
 4. Develop an immediate strategy for filling the Chair taking into consideration the long-term interests of the discipline as well as the strategic direction of the School.
 5. Consider the recommendations concerning the balance of staff resources across the disciplines in the School and develop a strategy to avail of opportunities to rebalance allocations in a manner that more closely reflects teaching and research activity in the context of any resignations, retirements and additional funding.
- (b) that College should:
8. In the context of the School's Academic Strategy 2005/09, pay particular attention to innovative plans for curriculum, teaching and research development in civil, structural and environmental engineering that might be supported through the College Strategic Fund in 2006/7 and thereafter, and/or through the work of the Trinity Foundation.

John Hegarty
Provost