

ASSESSING THE EXTENT OF CONSTRUCTION MANAGEMENT RESEARCH IN THE UK BY MEANS OF THE RAE, AND THE ARCOM AND COBRA CONFERENCES

Jim Birnie

School of the Built Environment, University of Ulster, Jordanstown, BT37 0QB, Northern Ireland.

The United Kingdom Government Research Assessment Exercise is the definitive method used to assess the quality of research being carried out within a university. This paper analyses the results in respect of the Built Environment Unit No 33 particularly in relation to Construction Management. Universities were examined by type as well as individually. A significant relationship was found between RAE scores and university type and between performance in Built Environment research and research scores over all academic disciplines. Production of academic papers for the ARCOM and COBRA conferences was quantified and a correlation was found to exist to the RAE scores. The paper concludes by discussing the importance of the findings for the future direction of Construction Management Research in UK Universities and the possible future relationship between Research Associations such as ARCOM and the RAE.

Keywords: ARCOM, COBRA, polytechnics, RAE, universities

INTRODUCTION

Construction Management, although a relatively new academic discipline has now an established research base, albeit still somewhat immature compared with other academic subjects such as physics, engineering and medical sciences. A number of events have contributed to the current research status of Construction Management. First, the UK Government Research Assessment Exercise (RAE) which has become the definitive method of assessing the quantity and quality of research carried out in academic institutions within specific subject areas. Second, the formation of research organisations such as ARCOM in the 1980s and COBRA by the RICS in 1995. Third, the upgrading in 1991 of the former Polytechnics (and their equivalents in Scotland) to university status (see Tables 2 and 4 for types of UK universities).

Whilst the objectives of the RAE, ARCOM and COBRA are not identical, all of them are directed to the production of academic research papers. This research paper examines the extent of publications in the field of Construction Management which has resulted from the ARCOM and COBRA Conferences. As the last RAE was carried out in 1996, the data used for this paper is taken largely from this event, and the ARCOM and COBRA conferences of 1995 and 1996 (The conferences immediately before and after the census date of the 1996 RAE). The data are analysed to see if any correlation exists between RAE scores per university and the number of conference papers produced.

Information obtained from interviews with researchers from selected universities regarding research activity and policy in Construction Management is also included in this paper.

RESEARCH ASSESSMENT EXERCISE (RAE)

The RAEs have played a major part in focusing the policy making decisions of universities in the UK towards research. First held in 1985, subsequent ones have been held approximately every four years in 1989, 1992 and 1996, the next one being due early in 2001. The most important impact of the exercise is that it determines, based on the assessment rating score achieved, how much government research funding will be allocated to each university for the period until the next exercise. Amongst the criteria used for assessment is the judgement by the assessors of the quality of research publications produced. For the 1996 and the 2001 exercise this means four publications per researcher included in the university submission. It is worth noting that whilst most of the rules of the RAE process are known beforehand, there is one important exception in that the monetary amount awarded for each grade is only made public with the announcement of the results.

Table 1 shows how the ratio of money per score has been allocated in the last two RAEs. This shows a trend to awarding more money at the top end of the scale and it is expected that this pattern will be accentuated further at the next RAE. This movement by stealth to creating a group of elite universities is growing apace. This group will be almost exclusively from the Oxbridge and Russell Group Universities (Table 2). Only eight of these universities are active in research in the area of the Built Environment (RAE Unit of Assessment No 33) and of these only two could claim to be active in Construction Management Research. The type of university within which research in Construction Management is carried is therefore important and is considered further.

Table 1: RAE Quality Funding Allocation of money

| Score | Funding Ratio | | |
|-------|---------------|------|-------|
| | 1996 | 1992 | 1996 |
| 1 | 1 | 0 | 0 |
| 2 | 2 | 1 | 0 |
| 3 | 3b | 2 | 1 |
| | 3a | | 1.5 |
| 4 | 4 | 3 | 2.25 |
| 5 | 5 | 4 | 3.375 |
| | 5* | | 4.05 |

CLASSIFICATION OF UK UNIVERSITIES BY TYPES

Whilst there is no agreed definitive classification by type of UK Universities, the following, largely based on historical origins of institutions is widely recognised (Robinson 1968 and Scott, 1973).

1. OXBRIDGE comprising Oxford and Cambridge.
2. RUSSELL GROUP The unofficial equivalent of the US Ivy League. Comprised mostly of the main English civic universities such as Birmingham, Nottingham and Sheffield, three of the older Scottish Universities, major colleges of the University of London and Warwick one of the newer universities of the 1960s. Exact number in grouping not absolute but currently seventeen plus Oxford and Cambridge.

3. Remainder of original universities not in the Russell Group or CAT Group below. Examples are Aberdeen and Reading.
4. CATs Former colleges of advanced technology upgraded to university status in the 1960s Examples are Heriot-Watt, Loughborough and Salford.
5. Former POLYTECHNICS (or Scottish Equivalents) upgraded to university status in 1991. Examples are Central England, Liverpool John Moores, South Bank and Trent.
6. Former Colleges upgraded to university status since 1992. Examples are Abertay and Luton.

Table 2: Universities by Type in relation to RAE

| Type | All Universities | RAE Unit 33 Built Environment | Cons Man (% of Total) |
|-------------------------------|------------------|----------------------------------|--------------------------|
| Oxbridge | 2 | 1 | - |
| Russell Group | 17 | 7 | 2 (5) |
| Other Universities | 26 | 7 | 3 (8) |
| Cats | 9 | 5 | 5 (14) |
| Polytechnics | 35 | 27 | 24 (65) |
| Colleges | 7 | 3 | 3 (8) |
| Other Non Universities in RAE | - | 4 | - |
| Totals | 96 | 54 | 37 (100) |

TYPE OF UNIVERSITIES AND CONSTRUCTION MANAGEMENT

There are almost one hundred universities in the UK. This research has used the figure of 96 as listed in the Times University Guide (1998). In the 1996 RAE Unit No 33 for the Built Environment, returns were received from 54 separate institutions (57%). However as the figure of 96 includes some specialist type institutions such as medical and language only, a truer percentage would be around 63%.

Not all the 54 universities in the Built Environment are active in the area of Construction Management. This research has identified 37 (Table 3 and 4) so active and the analysis has been based on this figure. This means that approximately 40% of universities are active in Construction Management research. The findings of this research show a great diversity in the research scores achieved and the consequent cash flows from Government that follows (Tables 1 and 6). The gulf between top and bottom is so great that the movement to some of the weaker becoming teaching only universities seems inevitable. The policy of professional bodies such as the Royal Institution of Chartered Surveyors (1999) of moving towards a restricted number of accredited centres can only add to this.

Table 2 shows the breakdown of the universities by type in relation to RAE Unit No 33 and also to Construction Management which is almost exclusively (87%) within the former Cats, Polytechnics and upgraded College types of universities, all of which are historically institutions with a vocational subject base. Whilst not a matter for immediate concern, the type of university within which most construction management research is undertaken has important consequences. First, the lack of a research culture and pedigree in the newer universities results in them submitting weaker research applications to the RAE (Table 3) and second, the RAE itself has been criticised that it does not give fair consideration to vocational and professional type research (HEFCE 1997).

Table 3: 1996 RAE Scores Unit No 33 by Type of University

| Type | No | No of Staff(% of total) | Avg RAE score 1992 | Avg RAE score 1996 |
|------------|----|-------------------------|--------------------|--------------------|
| Oxbridge | - | - | - | - |
| Russell | 2 | 58 (11) | 4.5 | 4.5 |
| Other Univ | 3 | 68 (13) | 4.0 | 4.3 |
| Cats | 5 | 89 (17) | 4.5 | 4.6 |
| Polys | 24 | 303 (57) | 2.1 | 2.4 |
| Colleges | 3 | 13 (2) | 1.5 | 1.3 |
| Totals | 37 | 531 (100) | | |

Note:- The above list is restricted to the 37 Universities identified in Table 4 as undertaking Construction Management Research. Cambridge which received a 5 grade is excluded as its research is in Land and Property.

RAE AND CONSTRUCTION MANAGEMENT

The RAE Guidelines states that the subject area encompassed by Unit No 33 includes architecture, building, construction management, landscape and surveying. The historical precedence given to Building Science as the core research area still dominates and should be a matter of concern for the new universities where the greatest number of undergraduate courses in related subjects exist. Following from the previous point, it is necessary to consider to what extent the results of the unit of Assessment overall reflect the sub area of Construction Management.

Not all research in the Built Environment was submitted under Unit No 33. Much of the material submitted to Unit No 34 (Town Planning) could have been equally forwarded to Unit No 33. However, most of this is likely to be in land and property and can be excluded from Construction Management. Evidence was obtained that at least 3 universities submitted Construction Management type research under two other Units of Assessment viz Civil Engineering and Business Management. The outcome of the results of this policy decision was insignificant to the overall picture presented by the results.

Of the four points listed above, only the matter of recognising that Unit No 33 scores reflect output in other areas than Construction Management needs to be considered. Obtaining absolute data regarding this was not possible for this paper for two main reasons viz shortage of time and more important the sensitive nature of the subject with the closeness of the next RAE. Interviews with a sample of the 37 universities suggest that approximately 30% of the total staff included in the RAE could be considered as researching within Construction Management. Based on this approximately 150 staff would be the figure for all 37 universities (Table 4).

ANALYSIS OF RESULTS OF RAE UNIT OF ASSESSMENT NO 33 (TABLES 3 AND 4)

- Number of staff for those universities which took part in both 1992 and 1996 has increased from 365 to 418 (13%)
- Majority of universities taking part for first time in 1996 have scored 1.
- Scores per type of university have not changed considerably since the 1992 RAE.
- Scores per type of university is still a key factor

- Relationship between scores in Unit No 33 and scores overall in the RAE(Times Scores, Table 4) gave the following Pearson R coefficient of correlation results:-

For all 37 universities $R = 0.755(P = <.01)$

For top 10 universities $R = 0.545(P = .05)$

CONFERENCE PAPERS

Table 5 gives details of the number of papers and associated authors for the ARCOM and COBRA conferences for 1995 and 1996 in respect of those universities which were involved in the 1996 RAE. 30 universities were identified, although one (Teeside) submitted under the RAE for Civil Engineering. In regard to the number of authors involved with papers this was in the range of 59 to 107(Mn =87) However if one takes the highest number of authors per university for either conference in 1995 or 1996, this gives a total figure of 166. This figure was found to include a number of authors submitting more than one paper per conference which reduced the previous figure to 140. This figure is close to the previously stated figure of 150 obtained from the RAE.

The mean number of papers per conference per university is 2.83. The overall correlation between RAE scores and number of conference papers was significant (See Pearson Correlation Coefficient Results Table 5). A number of universities e.g. Loughborough and Salford score well on both counts. The strong historical relationship of these two universities to their involvement in the ARCOM and COBRA Conferences may have had an effect on the number of papers submitted by them. In contrast a number of universities scoring well in the RAE have not provided papers to one or both conferences. Examples are Strathclyde and University of West of England.

Table 4 : Results of the 1996 RAE Unit of Assessment No 33 for the Built Environment

| Institution | Type | Rating 92 | Rating 96 | Staff No 92 | Staff No96 | Times Research ¹ |
|----------------|------|-----------|-----------|-------------|------------|-----------------------------|
| Reading | OU | 5 | 5* | 26.5 | 24.4 | 138 |
| Salford | CA | 5 | 5* | 17.3 | 31.0 | 130 |
| Loughborough | CA | - | 5 | - | 14.0 | 139 |
| UCL | R | 5 | 5 | 38.5 | 41.3 | 166 |
| Heriot-Watt | CA | 4 | 5 | 13.8 | 10.3 | 137 |
| Liverpool | R | 4 | 4 | 19.8 | 17.0 | 135 |
| Strathclyde | CA | 5 | 4 | 19.8 | 17.3 | 125 |
| Ulster | OU | 4 | 4 | 19.3 | 29.0 | 109 |
| Bath | CA | 4 | 3a | 10.3 | 16.8 | 151 |
| Cen Lancs | P | 1 | 3a | 11.3 | 4.0 | 74 |
| Glamorgan | P | 2 | 3a | 9.0 | 18.1 | 67 |
| Oxford Brookes | P | 4 | 3a | 28.3 | 22.4 | 78 |
| Sheff Hallam | P | 2 | 3a | 7.5 | 6.0 | 100 |
| Trent | P | 2 | 3a | 18.3 | 17.2 | 86 |
| UMIST | OU | 3 | 3a | 11.5 | 14.0 | 152 |
| Coventry | P | 3 | 3b | 10.3 | 13.0 | 65 |
| Glasgow Cal | PS | | 3b | | 8.0 | 70 |
| Napier | PS | | 3b | | 9.0 | 89 |
| N London | P | 2 | 3b | 16.3 | 11.0 | 76 |
| Wolverhaption | P | 2 | 3b | 7.5 | 10.0 | 53 |
| Brighton | P | 1 | 2 | 10.3 | 14.0 | 77 |
| Greenwich | P | 2 | 2 | 15.3 | 14.6 | 86 |
| John Moores | P | 2 | 2 | 3.5 | 21.6 | 83 |
| Kingston | P | | 2 | | 12.7 | 66 |
| Leeds Metro | P | 2 | 2 | 13.0 | 13.8 | 74 |
| Northumbria | P | 2 | 2 | 9.8 | 17.6 | 73 |
| Portsmouth | P | 2 | 2 | 7.0 | 5.4 | 90 |
| Robert Gordon | C | 2 | 2 | 8.8 | 14.2 | 70 |
| UWE | P | 3 | 2 | 8.0 | 11.6 | 80 |
| Abertay | C | 1 | 1 | 4.0 | 3.0 | 52 |
| Anglia | P | | 1 | | 4.0 | 57 |
| Central Eng | P | | 1 | | 31.0 | 55 |
| Luton | C | | 1 | | 11.0 | 51 |
| Man Metro | P | | 1 | | 4.0 | 73 |
| Plymouth | P | | 1 | | 6.5 | 79 |
| South Bank | P | | 1 | | 10.8 | 79 |
| Staffordshire | P | | 1 | | 2.0 | 58 |

¹Source: Times 1998 RAE Research Scores

Table 5: Conference Papers

| Inst | ARC 95 Papers | ARC 96 Papers | COB 95 Papers | COB 96 Papers | ARC 95 Auth | ARC 96 Auth | COB 95 Auth | COB 96 Auth |
|---------------|------------------|------------------|------------------|------------------|----------------|----------------|----------------|----------------|
| L'Boro | 8 | 13 | | 5 | 15 | 25 | | 10 |
| Reading | 4 | 1 | 4 | 2 | 6 | 2 | 4 | 4 |
| Salford | 5 | 6 | 12 | 7 | 10 | 11 | 16 | 9 |
| Liverpool | 4 | 4 | | | 8 | 11 | | |
| Glamorgan | 4 | 6 | 2 | 2 | 5 | 8 | 2 | 5 |
| Sheff Hal | 3 | 3 | 1 | 1 | 5 | 7 | 1 | 1 |
| Northumbria | 4 | 5 | 1 | 1 | 8 | 6 | 1 | 1 |
| John Moores | 4 | 3 | 2 | 4 | 8 | 6 | 2 | 8 |
| UCL | 2 | 1 | | | 2 | 3 | | |
| Wolv'hamton | 4 | 3 | | 2 | 10 | 9 | | 4 |
| Cen Eng | 2 | 2 | | | 4 | 3 | | |
| UMIST | 2 | | 1 | 1 | 4 | | 2 | 1 |
| Glas Cal | 2 | 2 | 5 | 5 | 3 | 5 | 5 | 7 |
| Ulster | 2 | 2 | | 1 | 2 | 2 | | 1 |
| Teeside | 2 | 2 | 2 | 1 | 2 | 4 | 2 | 2 |
| Trent | 1 | | | 1 | 2 | | | 2 |
| Greenwich | 1 | | 2 | | 1 | | 2 | |
| Anglia | 1 | 1 | | | 1 | 1 | | |
| Bath | | 1 | | | | 2 | | |
| South Bank | | 1 | | 1 | | 2 | | 2 |
| Cen Lancs | | | 2 | | | | 3 | |
| Heriot-Watt | | | 3 | 3 | | | 3 | 4 |
| Abertay | | | 3 | 1 | | | 3 | 2 |
| Portsmouth | | | 1 | | | | 2 | |
| Oxford Brooke | | | 1 | 4 | | | 1 | 7 |
| Napier | | | 2 | 1 | | | 2 | 2 |
| Plymouth | | | 1 | 1 | | | 1 | 2 |
| UWE | | | 4 | 6 | | | 7 | 11 |
| Luton | | | | 1 | | | | 1 |
| Staffordshire | | | | 1 | | | | 1 |
| <hr/> | | | | | | | | |
| Totals | | | | | | | | |
| Papers (Univ) | 55(18) | 56(17) | 49(18) | 52(2) | 96 | 107 | 59 | 87 |

Sources:- ARCOM and COBRA Conferences for 1995/96

Pearson Correlation Coefficients: RAE Unit 33 versus ARCOM 0.430 (P = <0.01)
RAE versus COBRA 0.441 (P = <0.01)

Table 6: Examples of Research Funding Allocations to Universities

| University | Amount(£) | No of Staff | Amount per staff (£) |
|------------|------------|-------------|----------------------|
| Cambridge | 62,955,857 | 1563 | 40,279.00 |
| Reading | 14,478,480 | 680 | 21,292.00 |
| Salford | 5,098,804 | 249 | 20,450.00 |
| Shef Hall | 3,117,798 | 274 | 11,379.00 |
| South Bank | 1,647,578 | 172 | 9,570.00 |
| Anglia | 313,239 | 137 | 2,286.00 |

CONCLUSIONS

This paper has examined the extent of Construction Management research as measured by the RAE and the ARCOM and COBRA conferences. The findings show that a large number of universities and their staff participate in research in this subject. In terms of quality in relation to the RAE scores the picture is mixed. The top two universities in RAE Unit No 33 have Construction Management departments

(Lansley, 1998). At the bottom end, the large number of former Polytechnics scoring 1 and 2 is a matter of concern. Reasons for this have been highlighted in this paper.

In relation to the conferences, the significant correlation between number of papers produced and the RAE score is encouraging. This relationship is important in a number of other ways:-

1. Enables new authors to get into the publication circuit
2. Enables universities wishing to climb the RAE score ladder to get an established base which should help them subsequently in achieving publications in recognised academic journals and also winning research grants by showing evidence of research published in conference papers.
3. Helps researchers identify the extent of research currently being undertaken in specific topics.
4. The Government policy to encourage research in the top universities by restricting allocation of monies to only those universities scoring highly has been discussed in this paper (Tables 1 and 6). In the HEFEC Review of the RAE (HEFCE 1997) consideration was given to a policy of discouraging weak universities from submitting. Whilst it may be thought that the knowledge that no payment will be received for a score of 2 would be sufficient incentive not to submit, other factors may be considered by these universities. Scores may be required by professional bodies and other research awarding bodies as a quality assessment indicator. It could be that the RAE and Conference Bodies such as ARCOM could come to a reciprocal arrangement to carry out this task.

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