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The Building Research Levy System used in New Zealand

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1. Introduction

Mr. Seaden's paper [1] refers in passing to the existence of a Levy system in New Zealand to create a fund for research and technology transfer to be used for meeting building and construction industry priorities. In 1995-6 this generated approximately 52% of BRANZ income. This paper describes the Levy funding system used in BRANZ, its genesis, and the conditions that would be needed for effective transfer of the concept to any other country. The paper also presents an example of a project that would have been beyond the scope of any single company in New Zealand to fund.

2. The Building Research Association of New Zealand (known as BRANZ)

BRANZ is, in New Zealand legal description, an incorporated society. This means that it is an association of people and organisations who have agreed to work together for a common purpose and obey a set of rules, which defines what the group intends to do, and how it will do it. The members can change the rules, and regularly do.

The New Zealand building industry is highly fragmented, as is true of most countries. The far-sighted in the industry have always recognised that there are very few companies who could afford the technical resource which BRANZ supplies to the industry if they were not doing it collectively. The answer to this was the Building Research Levy, which was imposed by Government statute at the request of the industry, to be paid to BRANZ. (Section 3 contains background information on BRANZ establishment.) A key issue is the industry responsibility to pay the Levy. As a result there is an expectation in the industry that it will have some say in the use of the Levy, and, flowing from this expectation, there is an extensive feeling of industry ownership of BRANZ. This means that staff must be capable of relating well to those in the industry, with good communication skills and a high preparedness to be responsive to industry needs rather than to follow their own agendas.

BRANZ started in 1970 as a partnership between Government and industry, with a direct grant from Government reflecting their contribution to the partnership. The funding flows to the organisation have subsequently altered in response to Government policies. The grant was monotonically reduced in real terms from 1984 to 1989. The Government explicitly ended the partnership concept in 1989, and ceased provision of the grant. The political climate in New Zealand by then was one of minimal Government involvement in the affairs of private enterprise.

Government research funding was focused on issues of "public good", which is not always exactly synonymous with industry development. Since 1989, BRANZ has been required to bid against other agencies for contracts from the Government's funds. This was beneficial to BRANZ, with a rise of about 15% (from the eroded base) in real terms in funds flowing from this Government pool to BRANZ over the following four years. However, when coupled with a major recession in the building industry in New Zealand which followed the share market crash in 1987 and only ended in 1993, BRANZ funding position was very fragile, and it was forced to seek much more income from specific services. This concept of "beneficiary pays" is now embedded in BRANZ operations even though the level of Levy income is presently above its long-term mean. The consequence of this is that the following pattern of income streams has occurred:

Source of income	**1975-6**	**1980-1**	**1985-6**	**1990-1**	**1995-6**
Building Research Levy	60%	63%	70%	59%	52%
Government grant (to 1989)					
or contracts (since 1989)	35	30	22	17	13
Fees for services	5	7	8	24	35

In 1995-6 BRANZ turnover was about NZ$8.7 million, and there were approximately 85 staff. About 50 of the staff are directly involved in providing research, testing and consultancy services to the industry, and another 6 in providing targeted publications for industry use.

BRANZ governing body is a Board which has 17 members at present, each of whom are nominated by an industry group. The original Board of 16 contained 5 members who were either senior public servants nominated by Government Departments, or were direct nominees of the Minister of Science. This was a reflection of the partnership that was deemed to exist at that time. The composition of the Board has varied down the years since, always with 16 to 20 members, and slowly reducing the number of people nominated by Government departments or the Minister, to none today.

Thus, an important characteristic of BRANZ is that the Government cannot control the Association's agenda. At the same time, the Government is its biggest single commercial client in terms of the research contracts that BRANZ carries out for it, and so BRANZ is responsive to Government views of needs for construction-related research.

3. The History to the Levy Act Introduction

The Building Research Levy Act [2] was passed in 1969. The political environment at that time favoured partnerships between Government and the private sector. The Research Association route was one such type of partnership. There were 13 Research Associations established in total, up to about 1973; that serving the pottery and ceramics industry has since closed, and most have changed in nature.

The key to getting BRANZ established was in finding a way that the industry funds could be derived on a fair basis. There had been several proposals put to the Government through the 1960s, but these had tended to load costs onto particular organisations or individuals. There was some construction-related research going on in New Zealand, but it was fragmented between Government laboratories and the Universities. There were gaps in the range of research areas being covered, and no laboratory dedicated to assisting the construction sector as a whole.

There had been in existence through the 1960s the Building Research Bureau. This was a joint-venture information service operated by the Master Builders' Federation, the Institution of Engineers, the Institute of Architects and the Manufacturers' Federation. Two key steps saw the evolution of this into BRANZ. The first was the agreement of these proprietors of the Bureau to transfer its assets to the newly-formed Association, so giving it a firm foundation. The second was the agreement of the builders, as the interface to the customers, to accept legal liability on behalf of all in the construction chain for payment of a research contribution. These steps indicated that the whole industry was getting behind the new entity, and the Government therefore recognised this as a true industry-wide initiative and agreed to become a partner.

When Parliament was debating the Building Research Levy Act, there was an explicit view that they would move to matching every levy-funded dollar by a Government grant dollar, though they would not start out at this rate until the organisation had proved its viability. In fact this never eventuated, and the closest that it came was in 1977-8 when the ratio of Government to industry was 0.78. The original threshold for projects to require Levy payment was set at $3000 in 1970. This has been raised since to $10,000 in 1982, and then to $20,000 in 1987. The Building Research Levy Act originally applied only to building projects, but with the introduction of a single

national performance-based construction code in 1992, to replace bylaw systems in each territorial authority, it was extended to some civil engineering structures (bridges, wharfs, etc).

The builder of any project worth more than $20,000 is thus legally liable for payment of the Levy. BRANZ can require of the territorial authorities that they supply the names of the builders involved in projects, for collection of the Levy by BRANZ. But it is more cost effective for everyone that the territorial authority should collect the Levy at the time it issues the consent for the project. BRANZ has an agreement with the territorial authorities that they will do this for a commission of 3%. The territorial authority then sends one cheque for the sum collected, and details of the projects on which it was collected, to BRANZ each month or each quarter.

The Building Research Levy Act requires at Section 8 that the funds collected "shall be used by the Association for the purposes of promoting and conducting research and other scientific work in connection with the building construction industry". Subsequent explanatory sub-clauses define this in terms of the establishment and operation of laboratories for carrying out research and testing, the establishment and operation of a library and other advisory and information services, the promotion of research into building and construction, the provision of grants to others to achieve like purposes, and the payment of necessary expenses to achieve these outcomes and for the governance of BRANZ.

4. Transferability to Other Countries

There is no reason why this model should not work well in any other country. The construction sector tends to be quite fragmented in every country, as it is in New Zealand. If there was a move to start BRANZ today in New Zealand, it would perhaps have quite a different character, because its industry environment is quite different from 1969. But the principles that would need to be established are the same:

Is there a coherent industry voice asking for the organisation to be created, and prepared to fund it at least partially?
Is there a basis for governing of the organisation which is agreed within the industry?
Is there a means of collecting the industry funding efficiently and fairly?

Is there a sufficient gap for the new organisation to have a role in the industry without needing to displace existing organisations?

5. An Example of Levy Funding Application

The following is a case study of a research project conducted by BRANZ, which shows how application of resources to understanding how a building system behaves in fire has resulted in the development of a new design method of benefit to the whole building industry and the wider New Zealand community. As in most countries, the New Zealand Building Code (NZBC) has specific requirements for performance of structures in fire. In the New Zealand case, this is mostly for life safety. The NZBC is "performance-based", and a system proprietor or designer is required to have credible evidence that his product will achieve the required performance. The design method which was evolved permits the application of a single test result to a wider range of similar systems, such that time can be saved in designing systems for specific requirements without the need for further advice from the testing laboratory. The pay-off for the industry investment is an ability to provide rapid, easily applied solutions to construction problems.

The cost to the proprietor or designer of a lined timber-framed wall for a full-scale test, supplemented by a report for recognition by approving authorities, is in the order of NZ$6000-$9000, plus the materials costs. In addition, there are limited facilities for such testing in Australasia, which introduces a delay that might even cost a proprietor a contract to provide a fire-resistant wall system. Once some tests have been done on a specific system, a testing laboratory can offer an opinion on how a specimen modified from a test is likely to perform. The cost of this is usually much less, $1000-$2000, being chargeout rate for several hours of professional advice. However, this option is limited to the availability of sufficient test data and an understanding of the processes involved to determine the probable outcome of any modification to the tested specimen.

A programme of research was undertaken to determine the effects of changing parameters on the performance of Loadbearing Light Timber Framed Walls when subjected to a standard fire resistance test. The first stage concentrated on establishing the mechanisms which result in the structural failure of a loadbearing light timber framed wall. This was done by a critical examination of column theory, which was then applied to timber wall studs protected by a membrane lining as employed in typical drywall construction. A model was developed which equated the residual load capacity of the stud

wall to the fire damage caused, when subjected to a fire resistance test for the required duration. Six loadbearing walls were tested to validate the model and establish any limitations in its application. The failure times and fire damage of the tested specimens were related back to the wall construction and the applied load.

Once the model was validated a graphical design method was developed and published in BRANZ Technical Recommendation No. 9 [3] which all the industry can use. This design method allows the result of one loadbearing test to be used to design a wide range of similar walls of different heights and loads, provided they use the same lining system. A new term, "charfactor", was introduced to quantify the fire damage, and this was used as the primary linkage between a prototype test result and new designs derived therefrom. This enables the cost of designing new wall systems to be limited to establishing a prototype test result, if one is not available, and the application of the published design procedure TR 9. The cost of carrying out the research leading to publication of TR 9 was $90,000, and it took 9 months. It would require the avoidance of only 10-15 tests on generically similar systems for the research to have paid for itself. This is a small fraction of the tests of this type that BRANZ has carried out in the past, and represents an opportunity for the advancement of loadbearing light timber frame construction for fire resistance which previously relied heavily on each individual variation being tested.

6. Conclusion

BRANZ Levy has provided a pool of funds for use in research which will benefit the construction sector and through them the public, by providing cost efficiencies and definitive information. An example of a case study of this has been presented - many others could be provided. If such a project could have been afforded to be fully funded by a proprietary company, they would customarily have kept the method for their own use rather than making it available to the whole industry.

Levy funds are used for technology transfer activities, through publications and seminars for example, as well as for research funding. A key to the continued flow of Levy funds, and to the industry perception of value of the work done, comes from the direct industry control of the fund application through BRANZ Board.

7. Acknowledgement

My colleague Peter Collier, who led the research project to which it refers, provided information for compilation of the case study.

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