# FILLING THE GAP

## The Social and Economic Structure of the Cavity Wall Insulation Industry

A report for BRECSU

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## INTRODUCTION

In September 1990 the Building Research Establishment's Energy Conservation Support Unit commissioned a study of the cavity wall insulation industry on behalf of the Energy Efficiency Office. The study was to examine the social and economic structure of the industry and the first part of the research involved a review of technical literature and a series of interviews with trade associations, manufacturers, installers and systems designers. This was complemented by a set of market studies, including a telephone survey of 400 home owners with unfilled cavities, a questionnaire survey of 235 Local Authorities, and a series of interviews with building surveyors, architects and other specifiers.

The research findings are presented in two separate reports: this one, *Filling the Gap*, portrays the industry. The other, *Finding the Gap*, describes the market.

*Filling the Gap* describes the cavity wall insulation industry at a a particular moment in its history. It is based on a review of technical journals and other literature and on interviews held between September 1990 and March 1991. The interview sample included representatives from all four Trade Associations, from five manufacturers and from twenty four installing companies, four of which were also systems designers. The project was, in part, designed to identify the effect of perceived technical risks on insulation practices in different parts of the country. Installing companies were therefore selected because of their location and the plan was to find installing respondents based in eight different areas, two chosen from each of four rain exposure zones as defined in the Building Research Establishment's 1989 guide, *Thermal insulation: avoiding risks*. In practice, rain exposure made hardly any difference to the industry and it was soon clear that insulation activity revolved around other factors. Distinctions between domestic and contract installers and manufacturer level competition were, for example, much more relevant. The sample structure was modified to take account of these features and the final list of twenty-four installing companies included two using foam, nineteen using fibre and six using bead. Some obviously used more than one material and several of the fibre installers offered both rock and glass systems. Eight of the fibre installers used Pilkington systems, four used Superglass material, four held franchises for Gyproc's Walltherm system, and five used Rockwool. In addition, four companies were also independent systems designers. Although respondents were not selected because of size or market sector, the final sample included thirteen companies which concentrated on contract work and eleven which devoted most of their energies to the domestic sector.

Most interviews lasted for at least an hour and generated a wealth of detailed information about particular circumstances and immediate commercial anxieties. Positions and points of view were understandably varied and manufacturers, installers and trade associations presented very different accounts of the industry. Responses were coloured by the respondent's place within a highly competitive business and an understanding of the interview material depends, to some extent, on an understanding of the position of each responding organisation at the time of the research. Drawing on this material, the report tries to identify some of the more durable social and economic relations around which the industry is structured. In that sense the discussion is not of present crises and dramas but of the contexts in which they develop.

Present relationships between installers, system designers and manufacturers are shaped by the industry's history and for this reason the first two chapters are about the past.

Chapter 1, The Story of Cavity Wall Insulation, reviews the development of cavity wall insulation as recorded in the technical journals and the building press. This first chapter also considers the role of building science and the influence of experimental and survey research.

Chapter 2, Filling in the Past, summarises the industry's history, concentrating on events and episodes which have influenced the number of installers and the types of insulation used to fill cavity walls.

Chapter 3, Promotion and Control, discusses questions of control and promotion with reference to the activities of the British Board of Agrément, the British Standards Institution, the National Cavity Insulation Association, EURISOL, EPCIA and the Cavity Foam Bureau.

Chapter 4, Manufacturers and Systems Designers, describes the influence of fibre manufacturers and the relationship between manufacturers' in-house systems designers, independent systems designers and installers.

Chapter 5, Installers, represents the views and perceptions of respondents who owned or managed installing companies. This chapter begins with a discussion of common characteristics and then distinguishes between those concentrating on the domestic sector and those relying on contract work for Local Authorities or for housebuilders.

The concluding chapter, Filling the Gap, considers the implications of industry's present structure for the future of filling in the domestic sector.

## CHAPTER 1 THE STORY OF CAVITY WALL INSULATION

Literature on cavity wall insulation falls into two broad categories: that which provides advice of the "how to do it" variety, and that which evaluates problems and risks. I shall not pay much attention to the former category: guidance does not differ over time and although the volume of advice changes from year to year it is difficult to interpret the significance of these patterns. "Problem orientated" debate is much more interesting. The technical journals catalogue concerns about cavity wall insulation and provide a wonderful illustration of the ebb and flow of fears and of the part that scientific evidence plays in this process.

The first two sections consider the history of the cavity wall and describe early forms of insulation. The third concentrates on a particularly dramatic period in the early 1980s and the urea formaldehyde foam scares, and the fourth explores the relationship between technical research and beliefs about cavity wall insulation.

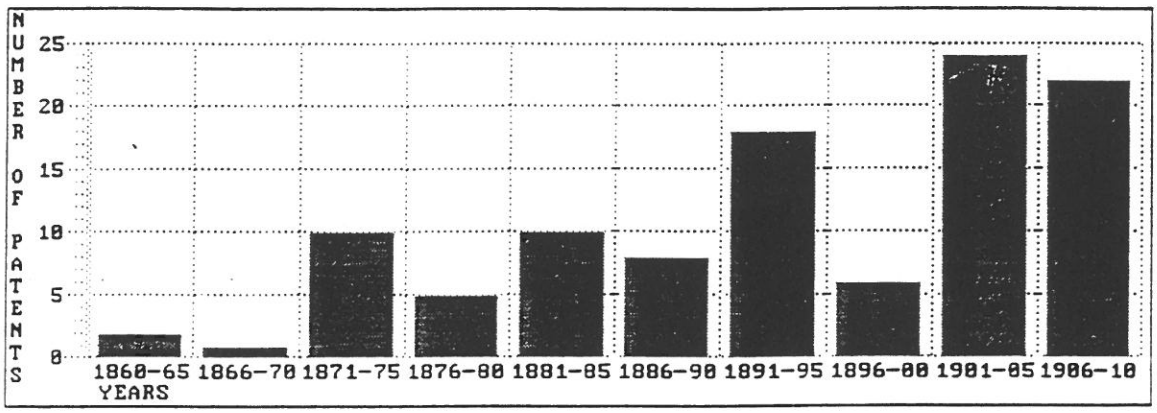
### Creating the cavity

Greeks, Romans, Egyptians and Vikings[1] are variously credited with the invention of the cavity wall. The trouble with these claims is that the mere discovery of a hollow wall or of two parallel walls is not especially informative. Hollow walls can be built for any number of reasons and as it is impossible to determine intentionality it is impossible to attribute historical significance. It is thus of little value to know that cavity walls "seem to have been used in Italy long ago by an architect named Alberti"[2] for we need to know about Alberti's motives before we know what to make of this information. Other examples seem easier to interpret. Early settlers in America put their beds alongside a special double skinned wall filled with straw, fisherman are reputed to have filled ceiling spaces with cockle shells[3] and York's Viking residents sandwiched panels of inter-linked willow twigs between their wooden walls. All look like attempts to improve insulation though they might, of course, have been a means of saving material, a question of fashion or, in some cases, an attempt to limit rain penetration. The development of cavity walls was undoubtedly erratic. The method was adopted and abandoned for a variety of different reasons and in a variety of different cultures and, whatever its early history, does not seem to have had much influence on building during the industrial revolution. As one writer has noted: "the benefits of cavity wall construction were largely ignored"[4] during this period.

The real re-discovery of cavity walling appears to have got under way in areas with extreme climates and a tradition of brick building, particularly the East coast of America. In Britain, Brunskill and Clifton Taylor quote William Atkinson's *Views of Picturesque Cottages with Plans*, 1805 as the earliest reference work to recommend a form of cavity wall construction.[5] By 1860 the technique was familiar enough to be the subject of technical debate. There was, for example, much discussion of the relative merits of ventilated and unventilated cavities: some commentators "believed that small air-grates or openings inserted in the bottom and top of the outer wall would admit a current of air and keep the inner wall dry." Others supported the opposite theory that "dampness does not come from without, through the wall, but is deposited from the air within when it comes in contact with the walls, which have been made cold".[6] The controversy continued until at least 1880 with writers also debating the qualities of different types of wall tie. In that year, Sir Edmund Beckett wrote of "hollow walls which are now

at last generally admitted to be expedient though architects are still wonderfully slow to propose them", saying that "the two vertical strata of a hollow wall are best connected by bits of iron tarred over ..and it is thought better even to give it a twist to prevent the wet creeping across. Perhaps glazed bricks, provided they have a step in them, are better still".[7]

The graph below shows the number of patents for double and hollow walls and for wall ties issued over the period 1861-1910. Data provided by the Science Museum.




This pattern suggests that the idea of building cavity walls was catching on but there is no documentary evidence of the rate at which the method spread. Contributors to *Building*'s Letters page during 1982 and 1983 vied with each other to identify early cavity walls and the examples quoted range from 1830 to 1867. Most of these were tied with "cranked bricks"[8] though some had specially made cast iron wall ties.

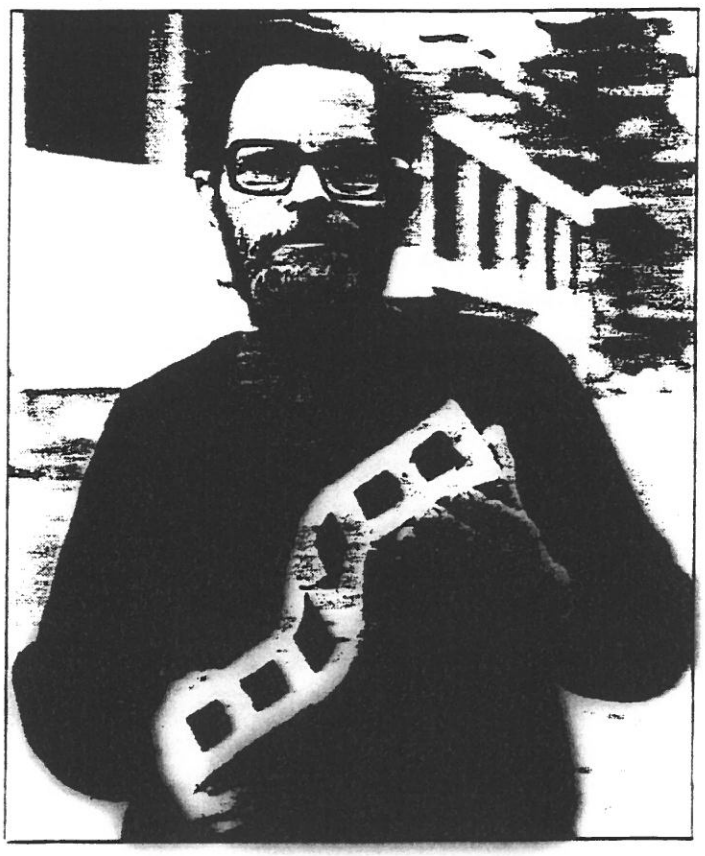


Illustration of a "cranked brick" from *Building*, 25 February 1983

Cavity walls were clearly on the rise at the end of the nineteenth century but it is not clear why. It may simply have been a cheaper form of construction. Brunskill and Clifton Taylor say that "the cavity wall was still regarded as a cheap substitute" in 1905 and quote earlier references to hollow walls "built in two thicknesses ...for the purpose of saving materials".[9] In contrast, Woodford claims that cavity walls were "for many years specified for more expensive houses."[10] The idea that cavity walls were an up-market option is reinforced by Burnett who suggests that the larger builders tended to set the pace, "Costains were using cavity walls from 1924 onwards when they were still uncommon in modestly-priced houses."[11] The production and promotion of facing bricks must have also played a part in the story. Although cavity walling is more labour intensive, the inner leaf can be built of less expensive materials and at some point and in some places this must have outweighed the cost of additional labour time.

Worries about the strength of cavity walls lasted for some time and Kathleen Watt, who reviews this debate, quotes William Simmons, "who objected to the lack of strength of hollow walls" in 1882. These fears gradually faded and, according to Woodford, the method became "a boon and a blessing" to the busy speculative builder of the 1930s because "it was almost foolproof against bad workmanship."[12]

Health was another important issue and cavity walls were at first thought "liable to become the breeding-place and recreation ground of all kinds of vermin."[13] The method was, however, believed to produce drier houses[14] and this counted its favour. Mr C Wales explains the history in these terms. Nine inch external walls built with facing brick "suffered from moisture penetration", and cavity walls were introduced in these circumstances. "As the housing drive increased and the subsidy decreased ... the 11¼ inch cavity wall became more common practice", replacing the earlier 15 $^{3}/_{4}$ inch cavity wall."[15] Concern about health and housing, and in particular about dampness, inspired regulation and control. Brunskill and Clifton Taylor quote Edwin Gunn who observed, in 1923, that cavity walls were sanctioned by the latest model by-laws.[16] Measures have to be pretty widespread before it makes sense to demand their use and regulation is not, in itself, enough to explain the increasing use of cavity walling. In any case, it seems as if legislation lagged behind practice in this respect.[17] Regional differences appear to have been quite marked at the end of the nineteenth century. There are, for example, cavity walled houses south but not north of the Tyne in the Newcastle-Gateshead area. Although proposed as a solution most appropriate for "modest rural dwellings in exposed locations",[18] the technique was also pioneered in urban settings. There is no national data on the spread of the cavity wall and no complete analysis of the factors influencing its development but somehow what was a pretty uncommon way of building walls in 1850 was, by 1950, almost universal. "Nobody", said the *Architectural Record*, "needs to explain what the words 'cavity wall' mean at this enlightened stage of building technique".[19]

Those who argue that a filled cavity is no longer a cavity go on to argue that the demise of "true" cavity walling was as fast as its appearance. Once house builders started filling the cavity they began to produce a three layered solid wall. Mr V Levett describes the apparent contradiction of building and then filling a gap in these terms: "The only real function, now, of the so rightly described 'cumbersome' method of cavity walling, is to withstand driving rain on severely exposed sites. On such sites the cavity should not be riskily compromised. For other

sites (most urban locations) there seems little logic in the complexity of building a cavity and then filling it, chancily, with an amorphous insulant".[20]

So what was it that led the construction industry to set about filling the cavities which it had so recently invented?

**Filling the Cavity**

It was quite a step to fill existing cavities and the notion met with heartfelt resistance here expressed by Mr R Crane, "to me the principle of filling the cavity defies all experience and common sense."[21]

The idea itself depended on the existence of something which met a range of quite specific demands: it had to fill every part of the cavity, it must not allow water to creep across the cavity, it must not absorb water, it must improve the thermal performance of the wall and it must be cheap and relatively easy to install.

Urea formaldehyde foam appears to be the first material to be tried in this role. Initially developed in Germany in the 1930s, urea formaldehyde foam was (is) put to a range of different uses. Its potential as a cavity filler was first explored in Scandinavian in 1950 but the idea took a while to develop in Britain: "better late than never the UK started insulating cavity walls in 1959."[22]

Nine years later the Building Research Establishment was still pretty guarded about the matter. Building Research Establishment Digest 94, June 1968, describes the risks involved: "in using the technique the original function of the cavity wall - prevention of rain penetration - may be defeated. ...the technique is not to be recommended in exposed areas ...and particularly in the more westerly parts of the country."[23] The *AJ*'s two part technical study of 1971, "UF foam cavity fill", is a detailed and cautious account, underlining the relative novelty of the method. Subsequent correspondence illustrates the suspicions of *AJ* readers and the promotional zeal of the developing industry.

The market was not opening up as fast as manufacturers and installers would have liked, leading one to complain: "I can honestly say that the suspicion attached to it (cavity wall insulation) in this country is far more considerable than anywhere else".[24] Another manufacturer, L Page, Group Leader of BIP Insulations, admitted that "there is some way to go, therefore before the unreserved acceptance of the general public is obtained".[25] J Lawrie provided reasons why the UK lagged behind: "two reasons undoubtedly are delusions about our climate and a Victorian 'spartan' hangover, and a tradition of freely available cheap fuel". But by 1975 this was "an attitude that no longer bears any relationship to fact".[26]

The oil crisis made all the difference. Installers and operators responded quickly and this created problems of its own. As a correspondent to the *AJ* noted, "Anyone can buy an installation kit costing £1 and then get a franchise from a chemical supplier".[27] In 1974 the National Cavity Insulation Association[28] had 2,000 applications for membership; the cowboys

had arrived and the scene was set for an explosion of cavity fill activity. But there was a snag. Filling a cavity counted as a structural alteration and permission had to be sought to relax the Building Regulations before making this change. Installers had to apply for a "type relaxation" of the regulations and fearful Local Authorities were unwilling to grant permission. Gloucester City, for instance, chose not to allow cavity fill so absolving itself of all responsibility should problems arise.[29] Local Authority practices varied, but the need to seek their permission created a real bottle-neck.

The risk of rain penetration seemed to be the critical issue. The industry sought to prove that this was low: "the experience of our members is less than 1% failure and most of these are caused by faulty building construction",[30] using survey evidence from the British Board of Agrément and other sources in support of their case.[31] But, as reported in *Building*, there were still "doubts among the BRE experts who take the line that cavities should be kept as cavities".[32] In fact the question was really one of responsibility, not of rain penetration. Should the Local Authority building control officer decide if a house was fit for filling, should that decision be left to the installer, or should the conditions of British Board of Agrément certification determine the answer?

It was an increasingly embarrassing debate for the Department of Energy was about to launch its "Save It" campaign. Meanwhile, the cavity wall insulation industry was reduced to 25% working; demonstrating installers dumped a pyramid of foam in Mr Crosland's front garden[33] and the industry applied what pressure it could. The Department of the Environment eventually revised its position in October 1975. The new rules changed the procedure whilst retaining the need for type relaxation and the balance of responsibility. Local Authorities had to be given seven days notice but providing this condition was met, providing the Authority had no objection and providing the installer and the system had British Board of Agrément certificates the work could proceed. In other words the Local Authority had to take action if it wanted to prevent a cavity from being filled.

This development had important consequences for the industry. This solution did not give installers control over the decision to fill and they were not completely happy with the new arrangement and associated guide-lines "in that a connection between dampness and cavity fill is implied".[34] The British Board of Agrément conditions already took account of rain exposure and were to be updated with reference to the driving rain index then being produced by the Building Research Establishment.[35] Although association with rain penetration was one concern, the arrangement had other far reaching consequences. It certainly released the bottle-neck but, at the same time, bound installers and systems designers ever more firmly to the British Board of Agrément. The new rules made it virtually impossible to operate anything other than a British Board of Agrément approved system and this created a more regulated commercial environment: "for installers, business now hangs on that precious Agrément approval and it is proving very difficult to enter into the field".[36] Perhaps because of this it seemed that the industry was settling down and in 1976 Mr S Ashley wrote: "it is beginning to look, probably for the first time, as if cavity fill is on the threshold of establishing itself".[37]

Certainly the journals go quiet on the subject as manufacturers and installers become increasingly confident. In an article titled "The Great Healer", the Chairman of Megafoam

observed: "the cavity wall industry has had a thrashing quite unjustly and was made a scapegoat but this is no longer possible". The sheer number of successfully filled houses was evidence enough of the reliability of UF foam and of the value of cavity wall insulation.

**Foam fears**

This contentment was not to last since worries about the safety of urea formaldehyde foam were already drifting across the Atlantic. Laboratory tests seemed to show that urea formaldehyde foam was a carcinogen[38] and formaldehyde gas appeared to cause shorter term health problems, respiratory complaints, irritation and other unpleasant symptoms. It was difficult to prove that UF foam was harmless and even more difficult to distinguish between potential risks attached to the material itself and those associated with its use as cavity fill.

The scare got underway in Canada and then America. Both countries banned cavity foam early in 1981, Canadian researchers concluding that potential effects ranging from "discomfort to the definite possibility of cancer were unacceptable".[39]

By the time it was a real issue in Britain somewhere between 600,000 and 1.5 million houses[40] had been insulated with UF foam and "the BRE UF foam expert estimated that the number of homes with potential problems must run into thousands".[41] Long term health problems might take a while to show but the odd thing was that there had been very few reported instances of immediate reactions or related symptoms. The NCIA defended the industry in these terms: "it is due to the low frequency of such occurrences ..and the fact that the side effects are shorter, if unpleasant, that this is not recognised as being a problem by the industry".[42]

It would have taken a lot to dissociate UF foam from the risk of cancer and there was a sudden rise in reported cases of short term reaction as awareness of the long term threat spread. These cases underlined and reflected growing mistrust of UF foam and provided a focus for otherwise diffuse fears. They came to represent all that was wrong with new technology and science, with new materials, and with their exploitation in the building industry. That American and Canadian houses were often of different construction or that the "real evidence" bought against U-foam was "at best highly controversial"[43] made no difference to the developing "moral panic".[44] For a while, cavity fill was the subject of much media attention and featured on Nationwide and News at Ten as an issue of great public concern.

It is not surprising that UF foam - or, as it was more dramatically termed, U foam,[45] generated this kind of response. Roughly a million households suddenly felt themselves to be at risk. Not only that, the risk came from something nasty lurking within the home itself. The material had disturbing qualities. Its ability to expand and creep through the cavity was evidently unnatural and suspicions were easily attached to this synthetic creation. As the news stories illustrate, the nightmare of an unstoppable foam monster was not far off: in Hemel Hempstead "U-foam had forced its way into kitchen cupboards pushing pans onto the floor",[46] and in Sheffield it "burst through the plasterboard inner walls of the homes, mainly into cupboards and around skirtings".[47]

Official guidance talks of foam in similar terms "It is often to be found ..behind bath panels where it enters through gaps around waste and overflow pipes", warning that there "may be hidden places where foam has escaped from the cavity". Once located, it was important to avoid direct contact with foam. BRE experts warned that "It is advisable to wear gloves and protect the arms and face adequately from accidental contact".[48] Innocent householders and "long suffering council tenants" were therefore cast as the unwitting victims of the material and of its cowboy installers.[49]

The described consequences were certainly unpleasant. The Shearings, for instance, "spent their first insulated winter sleeping with every window open for ventilation".[50] Two post office workers were "still suffering seven years after the work was carried out",[51] the Pettengell family could not "enter their bathroom without eyes streaming" and, in another instance, "a panic stricken family was forced to bring in the police to call out council officers as toxic fumes filled their home in yet another U-foam insulation contract that had gone badly wrong."[52] The real drama, though, was the closure the St Thomas More school in Essex. Headlines such as "School closes as UF foam fumes fill classrooms" did nothing to help the industry which was already so involved in the debate as to go along with Building Research Establishment's informal advice to "the very old or people with respiratory ailments to take into account the possibility of short-term discomfort which may follow UF foam installation."[53] The scale and the nature of the problem was, of course, impossible to determine. Could it be that people had suffered from the effects of formaldehyde gas in the past without knowing the real cause, was it really true that "lack of recognition of formaldehyde irritation has concealed the extent of the problem"[54], and why did some people react but not others? If anything these uncertainties exacerbated the situation.

Government scientists were looked to for expert advice and guidance. What exactly were the risks, how many homes were affected, what could be done to minimise damage and prevent any further threat? Until the early 1980s the only risk associated with cavity wall insulation had been that of rain penetration. As a result, the Building Research Establishment had to admit that "no research had been carried out into the necessary cavity containment of poisonous formaldehyde gas given off by the foam".[55] So far all regulatory effort had concentrated on minimising the risk of damp. Although the Building Research Establishment suggested that it was unwise to install UF foam in cases where the inner leaf was of plasterboard[56] there was no formal control over the use of the material.[57] Indeed the subject was so unanticipated that there was not even an official view: a Building Research Establishment spokesman said "we are not aware of any statutory limit for formaldehyde exposure in housing"[58] - and there was no consensus on whether this was a building issue or a medical question.

In response to demand for evidence, Donald Acheson began a "scientific study, without any prejudice, to find out whether there is any risk to man", and "launched an appeal for information on the possible cancer-inducing effects of toxic gas released from urea formaldehyde foam insulation".[59] Acheson intended to "find out what the truth is" about the risks of cancer and in October 1982 a further three part research initiative was launched to examine medical, chemical, and building/technical characteristics of cavity foam. These investigations took time to get under way and there were no immediate estimates of health risks associated with UF foam used as cavity fill. This cautious approach was quite understandable; after all "the

government would not like any department to become involved in any aspect of a scare that could precipitate the fury of owners of UF foam insulated houses".[60] Pressure to promote energy conservation also complicated the response. The argument that "cold is a far worse killer than UF foam, especially among the elderly"[61] was particularly influential as were the interests of the Department of Energy. For the time being government scientists restated claims about the lack of evidence while awaiting more conclusive research results.

Meanwhile, experts were called in to investigate particular properties. The St Thomas More school presented a fascinating technical challenge and researchers were publicly perplexed about this case which came to be "probably the most closely scrutinised insulation contract in the country". Conventional remedies such as sealing up gaps and using ammonia to neutralise the formaldehyde seemed to fail. The school was opened, closed and opened again. Building Research Establishment analysis showed that the formaldehyde gas was within an acceptable level and "cleared the foam of any associated risk".[62] Peter Barrett, a consultant called in by Essex County Council in April 1982, apparently disagreed.[63] In any event the symptoms remained and attention focused on the dust rather than the fumes.[64] Medical researchers explored similar theories, undertaking clinical tests at Brompton hospital into sensitivity to U-foam dust.[65]

Complaints persisted even when the foam was removed and technical experts finally resorted to psychological explanations: "many of the ill effects suffered by the children and staff could have been the result of stress, fear, (heightened by irresponsible press and media stories about cancer-causing effects) and even auto-suggestion - the opinion of Dr Barrett".[66]

All this effort took research into formaldehyde "beyond the Americans"[67] but by September 1983 America had lifted its ban and the story was about to end in a flood of headlines such as "UF foam reaction-overkill?" "Common sense on UF foam", and "Cancer risk evidence deemed inconclusive".[68]

These conclusions arrived too late, for the collapse of the UF foam market had already resolved the problem. Television coverage had been especially devastating and "cavity insulation sales dropped by as much as 75% after ITN broadcast adverse comments on UF Foam on News at Ten".[69] In August 1983, *Building* reported that only one major insulation contractor still existed, explaining that the aftermath of the scare "on this side of the Atlantic was a crippled industry".[70]

Bad publicity "cut back not only on UF foam insulation but, to a lesser degree, all cavity fill",[71] and there was a sense in which the problems of UF foam were seen as just retribution visited on those who broke with tradition and filled the cavity. In the longer term, however, loose fill manufacturers and installers benefited from foam fears and in January 1983 expanded polystyrene systems were the leading dry alternative.[72] The market for blown mineral fibre, exclusively installed by Rentokil since 1963, was also developing fast.

## Evidence and Experience

Scientific research was unable to halt the formaldehyde scare and public fears linger despite all the evidence. This section considers the role of research and the relationship between technical evidence and beliefs about cavity wall insulation.

There are two quite distinct sorts of research in this field: that which is undertaken by manufacturers with a definite commercial purpose; and that which is undertaken by independent organisations committed to building science.

The first type has obvious benefits for the cavity wall insulation industry. Manufacturers have invested heavily in the development of each of the main materials and fire hazards,[73] CFCs,[74] plasticisers, fissuring in foam, bonding and beads, and, more recently, cancer and fibre[75] have all been topics of extensive research. Manufacturers concentrate on the risks and properties of specific materials[76] and on the development of ever more competitive products. For example, BIP has developed a lower formaldehyde urea formaldehyde foam, Pilkington and Superglass have produced more precisely controlled glass fibre, Rockwool has concentrated on density, and so on. The volume of this sort of research activity varies depending on the state of the market and on predicted sales, but methods and motives are constant.

Building science research takes place under quite different circumstances. The Building Research Establishment has, for example, sought to produce valid and generalisable knowledge of relevance to designers, specifiers and consumers. Research programmes reflect theoretical as well as practical interests and in many cases the exercise is to explain the difference between predicted and measured performance. Subjects such as rain penetration and brick spalling have been addressed in this way but research on sound transmission and foam provides perhaps the best illustration of the approach.

Although the topic was of no great concern to the industry the Building Research Establishment undertook an experimental study of "The effect of resilient fillings on direct and flanking sound transmission with cavity masonry walls".[77] Discussion of the results, "A snag in cavity wall insulation",[78] concluded that sound insulation is reduced when walls are filled with UF foam. Researchers continued to work in this field until 1980 pursuing an issue of scientific interest despite the relative indifference of specifiers and installers.[79]

Although conducted within a scientific environment such studies are designed to inform building practice. As the following examples illustrate, researchers have employed a variety of methods in the hope of generating convincing and persuasive evidence for their client body.

Consider, for instance, research into the risk of rain penetration. Writing in 1975, D Whiteside of the Building Research Establishment said "Experience suggests that although rain penetration is not widespread, it does appear to be the most serious disadvantage of cavity insulation".[80] Builders and specifiers wanted a more precise estimate of risk and experimental and survey research was undertaken in response to these concerns.

Seven existing houses in Essex were subjected to a series of experimental trails in 1980 and a further nine newly built dwellings were tested in Milton Keynes in 1982. The houses were exposed to periods of artificial wind and rain and measurements of dampness were recorded before and after walls were filled. The results showed that "there was no obvious correlation between dampness and faults seen in the cavity during the pre-fill inspection", and that levels of recorded water penetration varied widely for different types of cavity fill.[81] Although the researchers concluded that the benefits of cavity wall insulation outweighed the potential disadvantages they noted that "that the installation of cavity insulants resulted in considerable increases in the quantities of water deduced to be crossing the cavities".

The research quoted above sought to identify generalisable principles and repeatable findings from experimental work involving just twelve houses. Such studies may well produce specific, repeatable results which reflect the operation of basic laws of physics. The problem is that confirmation of particular physical properties under experimental conditions is of unknown relevance for "real life" situations. The experimental process isolates just a few of the variables involved and cannot show how such a complex system as a whole house might perform.

Survey research gets round this problem and takes "real life" as its reference point. Large scale surveys of rain penetration such as that reported in the Agrément Board's Paper 6 or in the Building Research Establishment's Information Paper 2/88[82] purport to show the extent of the problem but reveal little about the nature of the complaint. Surveys record the incidence of rain penetration but not its cause. Knowing that all affected properties faced west or that all were built in a particular year would modify our interpretation of the survey results. However, such details are not usually available and correlation would not, in any case, provide an explanation. Survey data describes actual circumstances and, when converted into estimates of probability, of general applicability. The trouble is that it does not identify the causal mechanism of, in this case, rain penetration.

Experimental and survey methods are often complemented by impressionistic knowledge. For example, comparison of the temperature and moisture content of the external faces of filled and unfilled cavity walls combined with experience to help form the Building Research Establishment's view on brick spalling: "experience so far has shown that these differences are not a significant cause of frost damage".[83]

It is generally easier to find no evidence than it is to demonstrate a connection as the following examples illustrate. Eurisol's report "Thermal Insulation of cavity walls: Brick spalling - an investigation" concluded that "There is no statistical evidence correlating frost damage with insulated cavities." Although there was "no evidence to suggest that an insulated cavity wall is more vulnerable to frost damage due to the marginally lower temperature of the outer leaf"[84] doubts remained and in 1986 Eurisol was still defending its 1981 findings in an article headed "Brick spalling - is cavity insulation to blame".[85]

To summarise, building scientists have produced experimental results, survey findings, records of experience and absences of statistical correlation. However thorough the research there is always doubt about its meaning and relevance for building practice. It is difficult to produce convincing conclusions about building technology when actual performance depends on local

and unforeseeable circumstances. Research results are either so general as to have little specific relevance or so specific as to have little general relevance.

In this uncertain world personal experience and belief still carry great weight. This works both ways for the cavity wall insulation industry. Few have systematically studied the value of cavity wall insulation though C Trotman[86] undertook such an exercise in 1966, D Whiteside[87] evaluated the effects on his house in 1974 and Wiltshire Local Authority[88] attempted to estimate the value of foam insulation in 1988. All reported differences between actual and theoretically estimated savings as did the recent BRECSU study at Bourneville.[89] Much quoted estimates of fuel bill savings attributable to cavity wall insulation have nonetheless slipped into the industry's vocabulary. These vague estimates of benefit no doubt help to promote cavity wall insulation. On the other hand, the industry is unable to marshall enough convincing evidence to defend itself against negative but equally powerful beliefs. It proved impossible to halt the escalation of fear associated with urea formaldehyde and there is an ever present risk that similar scares will develop in the future. In July of this year an article headed "US puts cancer warning on glass fibre products"[90] appeared in the *Guardian*, perhaps heralding a new phase in the cavity wall insulation industry's history.

Looking back through the journals, debate about the benefits and risks of cavity wall insulation involves the presentation and counter presentation of personal belief. Scares develop very easily in this climate for the views of technical experts have no special status and no necessary consequence for the actions of specifiers or consumers. One opinion is as valid as the next and scientific contentions take their place alongside claims based on personal experience.

Curiously, just the same could be said of nineteenth century debate about the risks and benefits of the cavity wall itself. Indeed, the cavity wall might well be the result of a groundless or at least an ill founded scare about dampness and the causes of rain penetration.

1 R C De Vekey, *BRE IP 16/88*, notes that cavity walls were observed in ancient Greek and Roman structures; A E Whitehorne, *British Ceramic Society Transactions and Journal*, 1975, p5-8, refers to Roman cavity walls; Peter Bateman, *Building Technology and Management*, Vol 19, No 8, Sept 1981, writes: "the Vikings placed a primitive form of dry insulation based on wooden twigs in the walls of their houses in York"; and Richard Hall, *The Viking Dig*, 1984, p73, writes: "their (the twigs) function is uncertain but it is most likely that they acted as insulation, either woven together and attached somehow to the walls as screens or put into the roof space."

2 Sir Edmund Beckett, *A Book on Building*, 1880

3 *Cavity Foam Insulation*, General Information, Technical Paper 1, Cavity Foam Bureau

4 A E Whitehorne, *British Ceramic Society Transactions and Journal*, 1975, p5-8

5 R Brunskill and A Clifton Taylor, *English Brickwork*, 1977, London, Ward Lock. Appendix A - this is the best discussion of the subject I have found.

6 Kathleen Watt, *Brick Making Innovations in Britain: Building and Technological Change*, D.Phil Thesis, University of York, 1991

7 Quoted by H Newton, in *Building*, 8 April 1983. Interestingly, the 1876 edition of Beckett's book makes no mention of glazed bricks.

8 There were two phases of correspondence in *Building*, one in 1976, the other in 1982/3
A Birch, *Building*, 14 May 1976, letter on cranked bricks of 1865;
George Banks, *Building*, 24th September, 1982: Banks wrote: "I well remember the introduction of cavity walls to the building industry" sparking off the following series of letters from those who had earlier dates for this development;
Mr Birt, *Building*, 8 October 1982, letter quoting cavity wall house of 1887;
Mr Birch, *Building*, 22 October 1982, letter referring to cranked bricks of 1865;
P Longley, *Building*, 12 November 1982, letter referring to cavities in 1864;
J Dobson, *Building*, 21 January 1983, letter referring to a cavity wall house in Northumberland dated 1830 and another letter, from P Elphick, citing an 1866 house in Horsham;
V Side, *Building*, 23 January 1983, letter;
J Shove, *Building*, 25 February 1983, letter describing cranked bricks of 1850 found in Ealing;
J K Major and C W Paddick, *Building*, 18 March 1983, letters describing cranked bricks found in Reading. J K Major claims to have identified the illustrated brick as a "Jenkins Patent Brick made at Poole, Dorset."

9 R Brunskill and A Clifton Taylor, *English Brickwork*, 1977, London, Ward Lock. Appendix A - p145

10 John Woodford, *Bricks*, 1976, Routledge and Kegan Paul, p13

11 John Burnett, *A History of Social Housing 1815-1970*, 1978, London, David & Charles, p254

12 John Woodford, *Bricks*, 1976, Routledge and Kegan Paul, p13

13 Kathleen Watt, *Brick Making Innovations in Britain: Building and Technological Change*, D.Phil Thesis, University of York, 1991, p362. Simmons was a correspondent to *The Building News* in 1882

14 This is an interesting issue. Not all solid walled houses are wet and the rise in cavity walling may be the result of a "health scare" based on minimal evidence and on a simple - possibly mistaken - belief about the real causes of damp housing.

15 C A Wales, *Building*, 2 April 1976, "The cavity wall saga"

16 R Brunskill and A Clifton Taylor, *English Brickwork*, 1977, London, Ward Lock. Appendix A - p146

17 Kathleen Watt, *Brick Making Innovations in Britain: Building and Technological Change*, D.Phil Thesis, University of York, 1991, p363, describes London legislation "Provisions for cavity wall construction only appeared in London legislation in 1894 and then with the restriction that one side of the cavity should be the same thickness as a solid wall".

18 Kathleen Watt, *Brick Making Innovations in Britain: Building and Technological Change*, D.Phil Thesis, University of York, 1991, p353

19 *Architectural Record*, Sept 1958, p243

20 Vivian Levett, *Building*, 14 June, 1974, p105

21 Roger Crane, *Building*, 9th July 1982, letter

22 A E Whitehorne, *British Ceramic Society Transactions and Journal*, 1975, p5-8. A BIP leaflet "Save Heat with U.F. Foam Cavity Wall Insulation" says "It was first used in Scandinavian in the late 1940s and came to this country in about 1956"

23 "Cellular plastics for building", *BRE Digest 94*, June 1968, p2

24 Foamair Insulation, "Cavity Wall Insulation: to fill or not to fill", *Architects Journal*, 29 September 1971, p693

25 L Page, Group Leader of BIP Insulation, *Master Builder*, 1973, July, vol 18, no 7, p17-19

26 J Lawrie, "The use of fibrous insulation materials in walls - some technical and economic considerations", *British Ceramic Society Transactions and Journal*, 1975, p5-9

27 B Leeden, *Architects Journal*, 4 June 1975, letter p1166

28 Formed in 1973 and initially called the Cavity Foam Insulation Association

29 *Building*, 28 March 1975, p35

30 *Building*, 16 May 1975, p91

31 "The morning that Mr Crosland was not amused", *Building*, 20 June 1975, refers to a Building Research Establishment survey of 20,000 houses of which only 0.3% showed damp penetration. An earlier survey by the British Board of Agrément reported a 2% failure rate from a survey of 11,154 houses, T W Parker, "Performance in use of insulated cavity fill walls", *Agrément Board Paper 6*. The Building Research Establishment also quote a survey of 1973/4 of 36,000 dwellings, D Whiteside, 1975, "Thermal insulation of buildings: cavity insulation for dwellings", Building Research Establishment seminar paper.

32 "Keeping cavities as cavities", *Building*, 8 August 1975

33 "Demonstrations in London by Cavity Foam Installers", *Building*, 13 June 1975; "The morning that Mr Crosland was not amused", *Building*, 20 June 1975

34 Stephen Ashley, "Cavity fill: industry settles down", *Building*, 5 March 1976, p101

35 David Honeybourne, *BRE News*, 1975, Winter, No 34, notes that survey evidence and evaluation of non-foam methods plus the driving rain index are to inform the regulations which should apply equally to new and existing housing.

36 Stephen Ashley, "Cavity fill: industry settles down", *Building*, 5 March 1976, p101

37 Stephen Ashley, "Cavity fill: industry settles down", *Building*, 5 March 1976, p101

38 "Americans go for cavity foam ban", *Building Design*, 16 January 1981, p1

39 "Canada bans UF foam", *Building Design*, 1 May 1981, p1

40 600,000 from *Building Design*, 8 February 1980, p1; 1 million from *Building*, 26 March 1982, and 1.5 million from the NCIA, quoted in *Building Design*, 7 May 1982, p1

41 "US fears over cavity fill gas", *Building Design*, 8 February 1980, p1

42 "Foam Fury", *Building Design*, 15 February 1980, p9

43 "The great U-Foam debate", *Building Design*, 18 June 1982, p10-11, quotation from Peter Ion of the Cavity Foam Bureau.

44 Stan Cohen, *Folk Devils and Moral Panics*, 1972, describes a similar spiralling sequence of media events. The book relates to Mods and Rockers rather than UF foam but the process is comparable.

45 The change of terminology took place during 1982

46 "UF Foam: more cases found every week", *Building Design*, 30 April 1982, p1

47 "Airey homes hit foam snag", *Building Design*, 15 May 1981, p1

48 A Cockram and P Arnold, "Urea formaldehyde foam cavity wall insulation: reducing formaldehyde vapour in dwellings", March 1984, *BRE Information Paper 7/84*

49 It may be no coincidence that the late seventies saw an increase in the percentage of horror movies "where scientific 'side-effects' give rise to pollution and ecological imbalance" Andrew Tudor, *Monsters and Mad Scientists: A Cultural History of the Horror Movie*, 1989, Blackwell, p134. In this context, UF foam was a threat very close to home.

50 *Building Design*, 29 February 1980

51 "UF insulation led to years of sickness", *Building Design*, 19 June 1981, p1

52 "Police call in council for U-foam hit family", *Building Design*, 25 June 1982, p5

53 "Foam fights back", *Building*, 7 May 1982, p15

54 "US cavity foam storm: Britain is quite safe", *Building Design*, 23 January 1981, p1

55 "US fears over cavity fill gas", *Building Design*, 8 February 1980, p1

56 "US takes steps to end foam insulation fears", *Building Design*, 18 July 1980, p7

57 BS5617 was amended in September 1985 to restrict the use of UF foam to cavities with masonry or concrete inner and outer leaves, however the 1985 building regulations permitted UF foam even where there was no block or brick inner leaf provided that there was a vapour barrier.

58 "Social services report blames UF insulation", *Building Design*, 5 June 1981, p1

59 "Doctors start cancer survey: Action at long last", *Building Design*, 22 May 1981, p1

60 "Minister defends use of UF foam insulation", *Building Design*, 26 March 1982, p32

61 "Time to calm UF foam fears", *Building*, 14 May 1982, p5

62 *Building*, 28 January 1983, p11

63 "The great U-foam debate", *Building Design*, 28 May 1982, p6. Dr Barrett recorded formaldehyde levels between 0.1 and 1.0 ppm depending on the strength and direction of the wind blowing through the walls. See also *Building*, 28 January 1983

64 "Essex U-foam team blames dust in the air", *Building Design*, 28 January 1983, p4

65 "Essex U-foam Dispute", *Building Design*, 4 February 1983, p3

66 *Building*, 28 January 1983, p11

67 "False alarm on UF foam", *AJ*, 26 January 1983, p24

68 Robert Matthews, "UF foam reaction-overkill?", *Building*, 19 August 1983;
Ernest Hodgson, "Common sense on UF foam", *Building*, 9 September 1983, p6;
"Court lifts ban on foam insulation sales in the USA: Cancer risk evidence deemed inconclusive", *Building Design*, 23 April 1983, p4

69 "Nationwide risk to cavity insulation", *Building*, 10 September 1982

70 Robert Matthews, "UF Foam reaction - Overkill", *Building*, 19 August 1983

71 George Atkinson, "Has UK been luckier than Canada over UF foam", *Building*, 11 March 1983

72 "Essex U-foam team blames dust in the air", *Building Design*, 28 January 1983, p4

73 "Fire hazard from insulating materials", *BRE Digest 233*, and "Fire risk from combustible cavity insulation", *BRE Digest 294*. These documents provide guidance about the use of beaded and granular expanded polystyrene.

74 "Cavity wall insulation threat to ozone layer disclaimed", *Building*, 9 September 1988, p75

75 See, for example:
"Eurisol angered at health risk scare", *Building*, 27 February 1987, p8;
*Building Today*, 13 April 1989;
"Fibre and Cancer", *Building Today*, 27 April 1989;
*Insulation*, May 1989, December 1989, October 1990;
*Sunday Telegraph*, 7 January 1990, 21 January 1990;
"Workers die right on schedule", *Building Enquirer*, May 1990;
*Energy Action*, May 1990.

76 Warmawall, for instance, quoted test results showing that baby mice didn't like foam: "young rodents bedded down in Warmawall lose, thorough their unprotected skins, more fats than their organisms can produce, thus causing them to leave the area". Warmawall leaflet, 1968, Science Museum

77 E Sewell and W Utley, *BRE Current Paper 10/74*, 1974

78 E Sewell, "A snag in cavity wall insulation", *Building* 22 March 1974

79 E Sewell, "A simple model for assessing the importance for sound insulation of mass in external flanking walls associated with a cavity party wall", *BRE Current Paper 14/75*, 1975, and, later, E Sewell, R Alphey, J Savage and S Flynn, "Field measurements of the sound insulation of plastered cavity masonry walls", *BRE Information Paper 6/80*. Critics believed that the "BRE could divert their energies from such negative research towards the positive object of designing walls having good thermal and other qualities": P Causnett, "Insulation value outweighs decibel disadvantages", *Building*, 5 April 1974

80 D Whiteside, "Thermal Insulation of Buildings: Cavity Insulation for Dwellings", *BRE Seminar Papers: Thermal insulation of buildings*, 10 December 1975

81 D Whiteside, A Newman, P Kloss and W Willis, "Full scale testing of the resistance to water penetration of seven cavity fills", *Building and Environment*, 1980, Vol 15, p109

82 M Poutney, R Maxwell and A Butler "Rain penetration of cavity walls: report of a survey of properties in England and Wales", *BRE Information Paper 2/88*

83 Cavity Insulation, *BRE Digest 236*, April 1980

84 "Energy saving insulated brick housing", *Architect and Surveyor*, January 1982, p22

85 Fred Gallyer, "Brick spalling - is cavity insulation to blame?", *Building Control*, July/August 1986, No 17. See also *Building Technical File*, January 1987, and the industry's responses to Roger Humber of the House Builders' Federation, "Row rages over housing standards", *Building*, 12 June 1987, p12

86 *Heating and Ventilating Engineer*, 1966, December, p304

87 D Whiteside, "Cavity Insulation of walls: a case study", *BRE Current Paper No 20/74*

88 Ernest Hodgson, "30 Years of Cavity Foam", *Insulation*, September 1988. A straw poll of Wiltshire's tenants indicated that heating bills were reduced. Another Local Authority concluded that use of gas dropped by 17% once houses were insulated.

89 A Sluice (BDP Energy and Environment) and Don Ward (BRECSU), *BRECSU Report ED.281/319*, p17: "The average saving in space heating consumption in the trial houses was 900kwh (9%)" though the range of actual space heating costs over the 10 insulated and 10 uninsulated houses is quite striking - see page 12, Fig 3, of the same document.

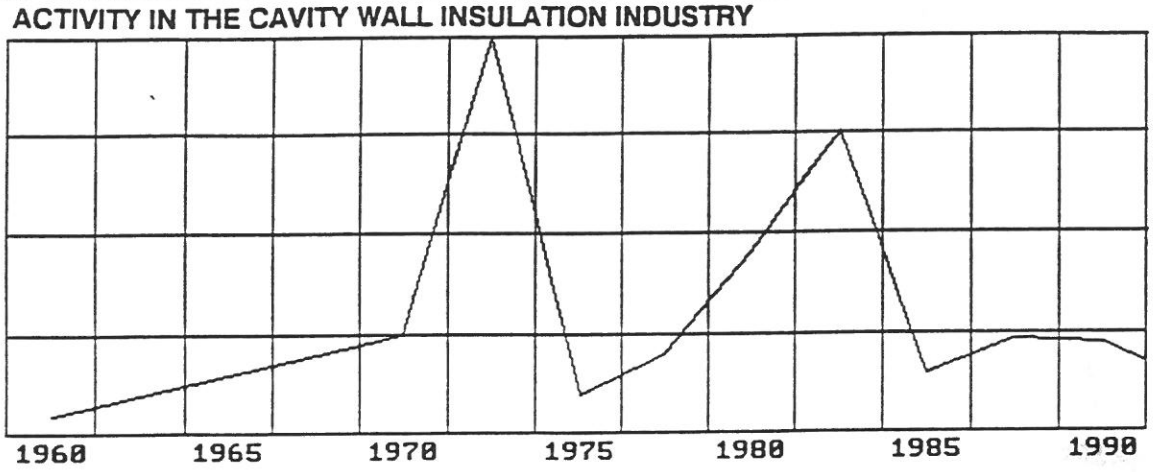
90 "US puts cancer warning on glass fibre products", *Guardian*, 20.7.91

## CHAPTER 2 FILLING IN THE PAST

The events described in Chapter 1 had significant consequences for the structure of the cavity wall insulation industry and for the volume of insulation installed in Britain.

It is impossible to recover data of the kind needed to produce a precise graph but the diagram below illustrates undisputed broad trends in cavity wall insulation from 1960 - 1991.

**ACTIVITY IN THE CAVITY WALL INSULATION INDUSTRY**




Notes:

The line traces the increase in cavity wall insulation occasioned by the 1973 oil crisis. It shows the steep decline related to the type relaxation problem followed by a period of recovery before the collapse of confidence in urea formaldehyde foam.

Fibre and bead enter the market in the mid 1970s but until then the graph represents the scale of urea formaldehyde foam filling.

Cavity wall insulation was sold almost exclusively to the domestic sector until the mid 1970s when the Local Authority and new build markets really began to develop.

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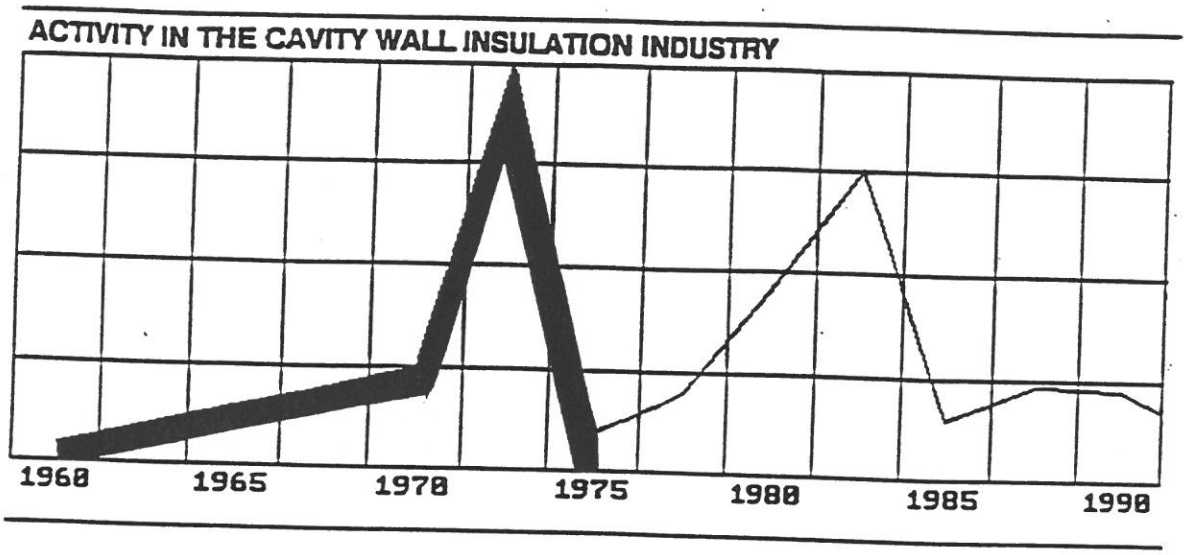
This chapter reviews the industry's commercial history and provides a context for subsequent discussion of the current concerns of trade associations, manufacturers/systems designers and installers. The first section considers the period from 1960 up to the type relaxation decision in 1975, the second describes the industry from 1976 to 1983, and the third reviews events since 1984.

From 1960 to 1975




In the beginning there was urea formaldehyde foam. A handful of British companies experimented with urea formaldehyde cavity wall insulation in the late 1950s using equipment imported from Denmark. After a slow start the numbers of interested installers grew and materials suppliers, British Industrial Plastics, Ciba-Geigy and Bordon Chemicals, began to worry about their reputations. Their future in this area depended on the effective use of their materials and on the actions of installers over whom they had no formal control.

This dilemma was particularly acute because of the nature of urea formaldehyde foam. Foam does not really exist until resin solution and foaming hardener are mixed on site and the success of the operation depends on that mixing process. The suppliers had no way of protecting themselves other by trying to control those who did the mixing. Many of the responses to this foam-specific problem continue to affect the industry and of these the notion of the system is perhaps the most important.

Insulation material cannot be bought on the open market but is instead sold to those trained and equipped to install it using approved machinery. The term *system* describes an approved combination of material or material type, machine and method of installation. The idea of the system therefore binds system designer (the organisation which develops a system and gets the specific combination of machine, material and method approved by the BSI or the British Board of Agrément), manufacturer (as supplier of insulation material) and installer together, and is the cornerstone of the industry. The cavity wall insulation business has been shaped by the power structure associated with this organisational framework and, right from the start, manufacturers and installers were locked into relationships of mutual, though not equal, inter-dependence.

Early installing interests included Megafoam, Warmawall, Rentokil and Baker Insulation. Each developed a further network of installers and thirty years on it is difficult to decipher patterns of ownership and influence. The supplier - system designer - installer relationship generated quite elaborate chains of commercial involvement. ICI, for instance, developed systems using BIP

materials which were at one time exclusively installed by Cape Insulation under the trade names first of U-foam and then of U-foam Plus.

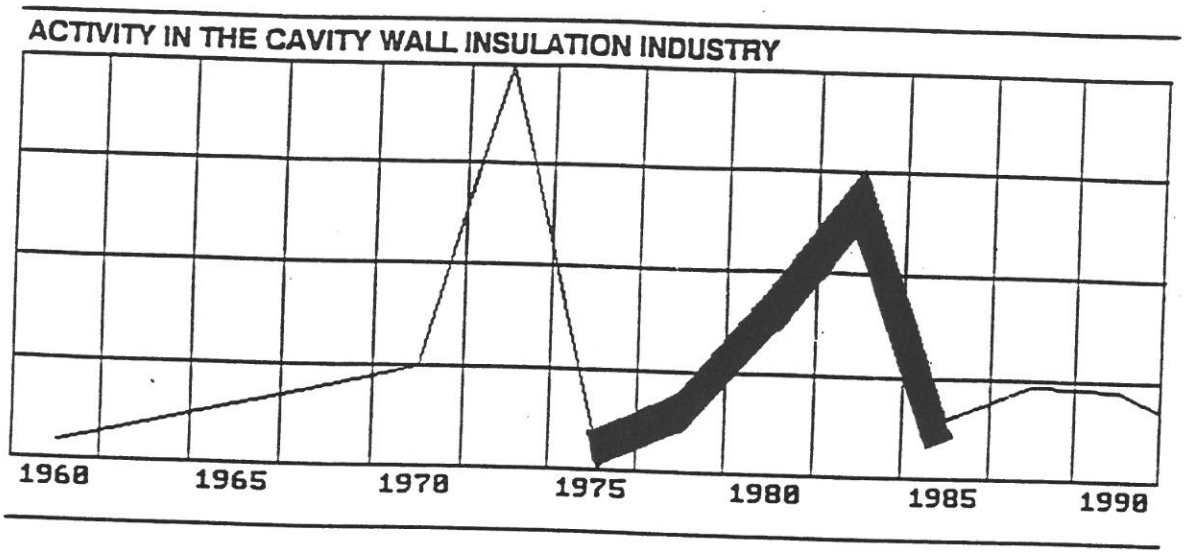
Materials suppliers obviously had an interest in installers' standards and practices and did what they could to increase public confidence in the method. In 1968, for example, BIP sought the involvement of the British Board of Agrément and helped to establish a list of British Board of Agrément approved installers.[1] But for the first twelve years or so there were no formal limits on the use of foam or on the contexts of its application.

In 1972 cavity wall insulation was deemed to represent a structural alteration and therefore required type relaxation of the building regulations. By this time established installers were facing competition from new entrants and were themselves beginning to worry about setting standards in order to protect their position. These emerging patterns of control were overtaken by the oil crisis of 1973 and the sudden and dramatic demand for cavity wall insulation. According to one respondent business quadrupled in three months partly because of fuel price rises and partly because of a real fear that there would not be enough oil to go round, whatever the price. The technology and the knowledge[2] were ready and waiting. It cost hardly anything to set up as an installer, and it seems that the industry mushroomed overnight.[3]

The forerunner of the NCIA was formed in that year as a technical and ethical protection group for those first installers besieged by what they saw as the cowboy element. For a time, cavity wall insulation attracted the attention of just about everybody with entrepreneurial ambitions and a van. There was certainly money to be made and new housing estates were a prime target. Fleets of canvassers sprang into action and selling was easy. In the words of one installer "you just had to walk down the street and ring a bell and everybody would come out".

Suppliers could not hope to control the use of materials in this unregulated situation[4] and cowboy installers were more or less free to mix supplies, re-interpret recipes and adopt a casual approach to storage. Critically, there was no way of monitoring the results of their work - once installed, cavity wall insulation is invisible and no one can tell if it has been properly installed or even if it has been installed at all. The potential for unethical behaviour concerned Local Authorities which by then had the right to intervene. Their growing reluctance to grant type relaxation (in theory because of the risk of rain penetration and technical failure) made life awkward for the installers. It was difficult to escape the Local Authority's notice and not even the cowboys went in for midnight drilling. Faced with these obstacles, mobile entrepreneurs moved out of cavity wall insulation as fast as they had moved in and the industry came to a standstill while the Department of the Environment and the Department of Energy resolved their differences (See Chapter 1).

From 1975 to 1983




The solution to the type relaxation issue[5] changed the structure of the industry. Installers needed British Board of Agrément approval if they were to continue in legitimate business and 1975 represented something of a watershed. Many pulled out though there was still great demand for insulation. In 1976 there were, for instance, 74 British Board of Agrément approved installers operating under the Beetle/BIP Certificate 73/206. This gives some sense of scale for 1976 marked the start of a further period of growth which continued until 1982/3.

The domestic sector still represented the main market for cavity wall insulation but installers were also selling to Local Authorities and even to housebuilders. Local Authority work has always been erratic for it depends on government funding and on Local Authority policy. Nonetheless it seems to have increased steadily after 1973 and by 1980 Local Authority contracts are said to have accounted for approximately 50% of the installers' workload. The building regulations first set standards for the insulation of walls in 1975, demanding a U value of 1.7. This was changed to 1 in the late seventies and to 0.6 in 1982. The market for insulation increased each step of the way.

This period also saw the development of new insulation materials. The 1973 oil price rises stimulated demand for all forms of insulation and inspired government action on a number of different fronts. It is important to remember that cavity wall insulation represents just one fragment of the total insulation industry and that its history and its future depends on that association. The homes insulation scheme introduced grants for loft insulation in 1979 and, partly as a result, three new fibre factories opened in Britain the following year. Rockwool International embarked on a joint venture with BP and opened a plant at Pencoed, Gyproc set up its glass fibre factory at Runcorn in mid 1980, and Cape began producing rock fibre at Queensferry and Stirling and glass fibre at Washington.

These national initiatives were pushed along by other needs and interests. Factories were built in areas of high unemployment - Rockwool, for instance, was able to take advantage of a skilled workforce initially trained in the steel industry - and there were huge government incentives for this sort of investment. There were also international pressures. American and

European interests were keen to provide the necessary fibre making technology and to set up elaborate licence agreements and export deals. In addition, two of the main participants, Gyproc (part of BPB industries), and Pilkington were well established companies with interests reaching across the whole of the building industry and beyond.

These and other factors help to explain the dramatic increase in the production of British-made glass and rock fibre. The manufacturing process generated vast quantities of edge trim, and it was treated and granulated edge trim, previously imported from Denmark, Spain, Belgium and the United States, which was used to insulate cavity walls. British production of cavity wall insulation rose because of developments in the rest of the insulation industry and these developments subsequently changed the importance of fibre as a material for cavity wall insulation.

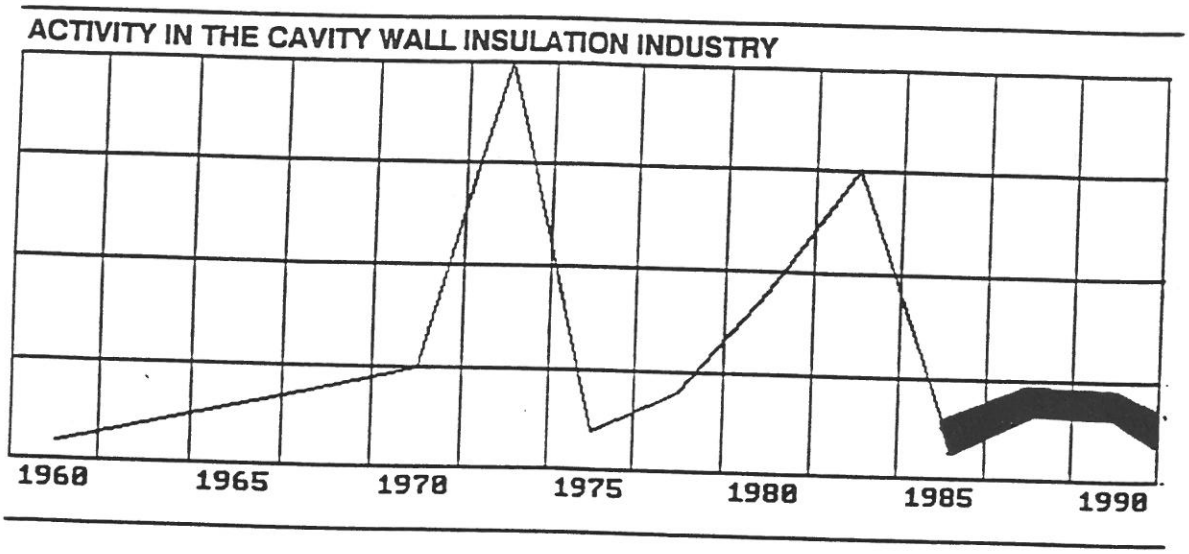
The first British Board of Agrément fibre certificate[6] was issued in 1969 and Rentokil[7] was almost the only organisation to use blown mineral fibre until about 1980. The first blowing machines were fashioned out of dustbins and bicycle wheels.[8] It was difficult to control the density of the fill and it was often easier to remove bricks than it was to drill holes of the size required.[9] Even so, blown fibre systems became the focus of intensive research by companies keen to develop a market for edge trim.

Expanded polystyrene bead systems were also developed during this period, but for completely different reasons. Expanded polystyrene has all sorts of uses and the bead sector of the cavity wall insulation industry is locked into the wider world of oil based products and plastics. Shell first used beads for cavity wall insulation in Holland towards the end of the 1970s and has been the main producer of sugar or unexpanded bead in Britain. Unexpanded material is sold to companies which do the expanding and then supply insulation installers. Early insulation systems used unbonded beads but Thermocomfort (a subsidiary of Shell) and others soon developed bonded systems involving the addition of a binding agent as the beads were blown into the wall. Although always more expensive[10] than foam, bead was generally cheaper than fibre during the early 1980s and looked set to take over in the aftermath of the formaldehyde scare.

In 1978 responsibility for monitoring urea formaldehyde foam systems and installers moved from the British Board of Agrément to the British Standards Institution.[11] The British Board of Agrément was established to ease the introduction of new building technologies and there was nothing unusual about this transition. They retained responsibility for approving the latest dry systems involving glass and rock fibre and expanded polystyrene beads, reviewing certificates every three years[12] (See Chapter 3 for further discussion).

In 1982-1983 media coverage virtually wiped out the market for urea formaldehyde foam. News at Ten, Nationwide, and Esther Rantzen had an immediate and dramatic effect and customers cancelled orders on such a scale that many foam installers went straight out of business. Most of those who survived were persuaded to take on other systems by bead and fibre manufacturers/systems designers eager to expand their market share.

From 1984 to 1990




The number of British Board of Agrément approved installers has remained at about the 200 mark[13] since 1984 (See Chapter 6 for further discussion) and in that sense the installer population never really recovered from the foam scare.

It is difficult to disentangle events but it seems that there was indeed a short period in which the market was dominated by expanded polystyrene bead installers using bonded as well as unbonded systems. This did not last, partly because of price, partly because of technical problems with water soluble bonding agents and partly because of active marketing on the part of fibre manufacturers and their systems designers. As always, manufacturers depended on installers to increase their market share and those who switched from bead to fibre helped to reduce the number of bead installations and so doubly improved the position of fibre.

At this point it is important to distinguish between different types of fibre and between different fibre producers. The key companies of the early 1980s were Rockwool, Pilkington, Gyproc and Cape. All were competing in the wider world of insulation and all developed cavity fill systems using recycled loft material and edge trim. Cape was the first to actually own a network of installing companies and seems to have worked especially hard to compete in this field. Pilkington's installing company, Cosyworld, was relatively short lived and other manufacturers kept their distance from the contracting side. In 1982 Cape's installing division (which was involved with foam as well as fibre) fragmented and each of the four directors set up independent companies. Cape continued as a fibre manufacturer until December 1984 when its Queensferry and Stirling factories were acquired by Pilkington.[14] Pilkington moved into rock as well as glass fibre as a result and Queensferry[15] became the focus for further investment. The Stirling factory was closed and sold off to an industrial estate developer. Meanwhile, development work continued on glass wool and in 1988 Pilkington produced a new white wool, a virgin product especially made for the cavity wall market.

Rockwool was Pilkington's main competitor in rock fibre and Rockwool also invested in the development of more efficient blowing machinery. Density is a critical issue for rock fibre producers and although the figure has ben halved (from 80 to 40 kg/m$^3$) in the last ten years

rock fibre is still installed at roughly twice the density of glass. Rockwool has nonetheless retained its installer network and has kept its prices - and theirs - at a level which allows both to stay in business.

For a few years, then, Rockwool and Pilkington were the key competitors, with Gyproc maintaining a much smaller share of the glass fibre market. That changed in September 1987 when Superglass started manufacturing glass fibre at the ex-Cape, ex-Pilkington plant in Stirling. Details vary with each re-telling, but the story of Superglass's triumph over the unpopular giant Pilkington is usually described with some enthusiasm. The Pilkington site was bought by Encon (Superglass' parent company) complete with its two rock fibre production lines.[16] These were converted to make glass fibre using the latest glass wool technology imported under licence from America and the Superglass factory started manufacturing in September 1987. Superglass Insulations Stirling now has approximately 100 staff, many of whom were formerly employed by Pilkington. Over the last four years Superglass has managed to attract installers and sell its version of virgin white wool despite the pressures of a declining market.[17] Superglass/Encon has exploited its knowledge of the installing population and has developed a more flexible approach towards the manufacturer/systems-designer/installer relationship. Although Superglass/Encon has a small share of the market, its achievement has unsettled established manufacturers all of whom have cut back on sales and marketing staff in response to ever lower profit margins[18] and ever fiercer competition.

Current fibre price wars are not simply a reflection of over-production or of over-capacity, for the sheer availability of material is not crucial. The critical issue is the profitable use of that material and the efficiency with which manufacturers can actually get it installed in walls. For that they depend on their installers.

To summarise, mineral wool systems now account for about 70% of the total cavity wall insulation business. Fibre blowing machines are better controlled, faster and more efficient than those of the early 1980s. In addition, the economics of edge trim have changed in response to more exact methods of manufacturing and accounting.[19] This has occasioned the production of purpose-made cavity wall insulation.

There have been steady improvements in insulation technology: reductions in the size and number of holes required;[20] increases in the speed of filling; and advances in fibre density and bead bonding. The cost of cavity wall insulation has decreased; according to one installer current rates are a quarter of those quoted six years ago. Although the market for cavity wall insulation has changed during this period, falling prices have not increased overall demand. The single domestic market of the early 1980s has vanished and installers now concentrate on Local Authority contracts, on working for volume housebuilders or on selling to private householders. There is some pattern to this specialisation. Roughly 60% of foam installations are for private householders and, according to one respondent, nearly 75% of all fibre filling is done for Local Authorities.[21] Bead installers are divided, some working in the domestic sector, others specialising in the housebuilder market. This trend towards increasing specialisation means that installers and, to a lesser extent, manufacturers, are variously dependent on mortgage and interest rates, on patterns of Local Authority funding, or on building regulations and the ups and downs of the housebuilding industry.

For the first twenty years (from 1960 to 1980) installers used the same materials and worked for the same sort of customers. Over the last decade, however, the industry has fragmented and, as a result, there are now trade associations for each of the main materials: EURISOL for fibre, EPCIA for beads, and the Cavity Foam Bureau for foam. This fragmentation disguises the general shift from foam and the domestic sector to fibre and the Local Authority market. Competition within the fibre sector tends to obscure technical similarities but there is now hardly any difference between the newer blowing machines.[22] Fibre systems are not as distinct as they once were and technical convergence may, in the long run, undermine the logic of separate system approval.

This brings us to the present day but before leaving the past it is useful to highlight three key elements, the constant interaction of which shapes each of the phases examined in this chapter.

These three critical variables are:

a) the interdependent relationship between installer and manufacturer/systems designer

b) the relationship between external pressures and those which are internal to the industry and

c) the changing character of the market for cavity wall insulation.

Consider, first, the relationship between supplier and installer. Manufacturers and systems designers depend on installers to convert material into profit. To do that installers need to buy material with which they can compete. Hence there are pressures on manufacturers and systems designers to develop fibre of more predictable quality, to produce systems which will work with smaller holes, and so on. Installers are bound to specific systems and are consequently favoured or hampered by their manufacturer's pricing policies and investment strategies. To some extent the balance of power shifts with volume and demand: when times are bad manufacturers are more desperate to sell and so more dependent on installers, and when times are good the reverse is true. But of course the "goodness" and "badness" of times is in itself partly a consequence of the actions of manufacturers and their installers.

Although some livelihoods depend on cavity wall insulation, many installers have other business interests. The same is true of manufacturers and systems designers and there is a sense in which cavity wall insulation does not really exist as a well defined industry with a life of its own. The development of blown fibre can, for instance, be traced to the 1973 oil crisis, to the subsequent demand for insulation of all types, to the expansion of British glass and rock fibre production and to the need to find a home for edge trim and surplus capacity. In other words, decisions which have tremendous consequence for the cavity wall business are often taken for quite unrelated reasons.

That competition is further complicated by the structure of demand. There is no single market and private householders, local authorities and housebuilders make decisions within entirely

different financial and cultural frameworks. Although installers tend to specialise, most compete in two and sometimes three market sectors, somehow managing to accommodate enormous differences of selling style and profit margin.

Commercial interdependence, external pressure and market demand have combined to shape the history of cavity wall insulation. The next few chapters examine these themes in greater detail and, in the process, describe the industry's present structure.

1 The British Board of Agrément was already in the business of approving insulation *systems*.

2 Manufacturers produced simple instructions such as those contained in BIP's little red *Beetle* pocket book. This short guide contained all that the novice installer needed to know.

3 It is impossible to quantify this mushrooming - the NCIA claims to have had 2,000 applications for membership but there are few other indications of the actual level of activity.

4 Or perhaps the volume of demand was such that the suppliers were content to let the control mechanisms slip.

5 Type relaxation was still required but it was the Local Authority's responsibility to refuse rather than grant permission to British Board of Agrément approved installers.

6 Quoted in T Parker, "Performance in Use of Insulated Cavity Fill Walls", *British Board of Agrément Paper 6*, as Agrément Certificate No 69/28, "Hermeseal Rockwool".

7 Rentokil seem to have used fibre from a variety of different sources including Pilkington and Rockwool Denmark. In the early stages the market for fibre was limited because of the cumbersome process of installation and because of the density required.

8 Fibre fell through the spokes of a bicycle wheel and at least one machine was known as the 26 and $1^{3}/_{8}$ths in honour of its main mechanism.

9 Most systems needed a 2" hole.

10 Expensive, that is, to the installer. The price of bead is related to the price of oil. In addition installers have to take account of the costs of storage and distribution and beads are necessarily bulky.

11 BS5617 relates to the materials and BS5618 to the process of installation. Transition to the BSI began in 1978 and was complete by 1980.

12 As it happens, the BSI never took over this job from the British Board of Agrément. Although the British Board of Agrément was not set up to police normal practice it now has this function and is responsible for monitoring bead and fibre installers on its approved list.

13 The number has fallen sharply in the last year or so to approximately 140 in February 1991

14 Rumour has it that Cape came off worst from a series of price wars and that Pilkington was able to buy the two factories for a remarkably low price.

15 Pilkington are said to have invested something like £10 million at Queensferry. This factory also produces rock fibre for Ecomax. Ecomax used to be the Swedish "branch" of Rockwool International and was an important source of imported fibre. It has since been nationalised and so operates independent of Rockwool.

16 In one probably apocryphal version of the story Pilkington even left the computers running and so unwittingly handed over customer information, sales records and pricing details.

17 Encon is involved with a whole range of insulation products and their distribution. In January 1989, *Building* quoted Encon's reported 10 fold increase in pre tax profits and 60% turnover. At least some of this related to cavity wall insulation.

18 In theory this has consequences for other insulation materials, all of which have to compete in the same market. In practice the effects are complicated because prices are set at radically different levels in each sector of the market. As discussed elsewhere different installers (and to a lesser extent different materials suppliers) tend to concentrate on different sorts of customer.

19 There is less and less wastage as the efficiency of main production lines increases. It makes no sense to add resin and then chop up prime loft insulation for use in cavity walls and in these circumstances it is cheaper to produce a resin-free white wool. Of course, "cheaper" depends on the accounting procedure. If edge trim and mid-line-switches are costed as scrap they can be turned into free cavity wall insulation. However, this approach puts up the price of the prime product which has to carry a higher overhead for wastage. If, on the other hand, the cavity fill value of waste material is accounted for, prime product can be sold for less.

20 This differs for each material and for each Agrément certificate.

21 Fibre manufacturers have good reason to concentrate on the Local Authority market - they need to deal in volume (which rules out the domestic sector) and as insulation manufacturers they are able to make more profit on batts than on blown cavity fill (which limits their interest in the housebuilder market).

22 As demand has dropped many of the smaller machine makers have moved out of the business. Although there are plenty of second hand machines there are fewer companies producing new ones. Hence the convergence.

## CHAPTER 3 PROMOTION AND CONTROL

Selling cavity wall insulation involves selling a promise. If all goes well, satisfied customers have no visible sign of their expenditure and it is difficult to think of a better context for sharp practice and downright cheating. What could be easier than drilling a few holes, setting up and running a machine, making good the holes and departing? How would householders know if walls remained uninsulated? Heating bills are not the most reliable measures of insulation and, short of a thermographic survey, there is no way of checking the work.[1] There is so much obvious scope for cowboy behaviour that, paradoxically, the industry's promotion and expansion depend on its restraint and control.

Of course control has economic as well as ethical consequences: if the cowboys left there would be more work for honest installers and if only there was more work, fewer honest installers would be forced to adopt cowboy-like practices in order to make a living. In this context control is a form of protection and has benefits for specific installers as well as for the image of the industry as a whole. Control also benefits controlling organisations. Testing and surveillance is a service and those who provide it have to determine a standard and a cost which their customers will accept.

This chapter explores the relationship between control and promotion at a national level and involves discussion of the four trade associations and of the British Board of Agrément and the British Standards Institution.

### Control

The industry subjects itself to three different sorts of vetting. The British Board of Agrément and the BSI approve systems and installers; the NCIA vets its members; and manufacturers and systems designers spend much time checking on installers whose performance they guarantee. Each has a different purpose and methods of assessment vary accordingly.

The British Board of Agrément's approach reflects the history of its involvement with approval and control. The British Board of Agrément was established to "encourage the acceptance of innovation by the construction industry and associated professions by giving authoritative assurance that such innovations met the claims made for them"[2] and it aims to evaluate "performance in use" through the development and application of standard assessment procedures. Methods of building science are thus brought face to face with variable building practice, with interesting consequences both for the industry and for its monitors.

Testing procedures are governed by a number of different requirements. First, the British Board of Agrément's reputation depends on the reliability of its assessment and it cannot afford to certify products or processes which fail. Second, methods of evaluation have to be standardised. Systems of cavity wall insulation have to be compared with respect to the same variables and there has to be some constant measure of acceptability. Third, the cost of the testing process has to be set at a level which the industry can bear. Chosen methods such as "adequacy of fill" and "rain penetration" tests represent working compromises between all three demands.

Manufacturers apply to have new and revised systems approved and enter into a contract with the British Board of Agrément which then undertakes an agreed programme of testing. Experimental trials would be compromised if circumstances varied and standardisation is inevitable if materials and methods are to be evaluated against common criteria. Test conditions are consequently unrealistic. The rain penetration test, for example, assumes a perfect wall. Obviously this does not represent actual building practice but the only alternative would be to define and incorporate standard defects.[3] Because the test is of the system, ie. the product in use, blowing machines are also precisely defined and their use carefully specified. Again, normal conditions cannot match those of the testing rig and, again, this discrepancy is inevitable. Those involved, monitors as well as monitored, have to live with the level of precision demanded by the experimental method and, as in all scientific endeavour, there is room for judgement and negotiation.

Although designed to ease "acceptance of new products and processes"[4] the costs of testing[5] inhibit incremental development. The British Board of Agrément and the systems designers have different interests here. From a systems designer's point of view it should not be necessary to completely re-test a system in order to publicly validate an improvement in, for example, the blowing machine. On the other hand, the British Board of Agrément is unlikely to risk its reputation or its income by accepting uncertified and untested modifications. The British Board of Agrément has considerable influence over the terms of the service which it offers[6] and is able to determine the rules of assessment. If it did not, its "totally independent" position would be undermined as would the status of its certificates.

The British Board of Agrément and the BSI are both involved with monitoring installing contractors and both have methods for examining and recording performance. The British Board of Agrément was initially invited to monitor installers on behalf of foam manufacturers. Its place in the industry changed in 1975 and after that date installers were unlikely to get work without British Board of Agrément approval. The BSI took on the job of monitoring foam installers in 1978 and it has since been impossible for unregistered companies to buy resin and hardener. In 1984 cavity wall insulation was redefined in terms of the building regulations. It no longer counts as a structural alteration and its use no longer requires type relaxation. In theory this means that there is no need for bead and fibre installers to be registered with the British Board of Agrément[7] but in practice Local Authorities (which still have to be notified) can make life awkward for those who are not.[8] Foam installers, of course, have no choice about their relationship with the BSI.

In monitoring installers both the British Board of Agrément and the BSI seek to prevent bad practice and provide consumer protection with respect to technical standards. These intentions do not automatically define appropriate methods of surveillance and current approaches represent a balance between cost and rigour. Monitoring organisations tend to focus on relatively visible issues such as training and administrative procedure. British Board of Agrément approved installers, for example, are currently obliged to buy two monitoring visits per year per team and one headquarters inspection. That is not all that they buy. The British Board of Agrément name has a value unrelated to the costs of surveillance and it is the logo, the certificate, and the associated credibility that are really bought and sold.[9] Even disgruntled

installers proudly announce that they "are not the sort of firm" which would forego British Board of Agrément approval, and in making use of their British Board of Agrément credentials installers promote the very system about which they have private complaints.

Installers and systems designers recognise the marketing value of demonstrable control. So too do the industry's trade associations. The first objective of the National Cavity Insulation Association is to "establish and maintain high standards of conduct and competence in the business of cavity wall insulation, to ensure a good service to the public and industry, and to promote confidence in the techniques of insulating cavity walls as practiced by its members".[10] The NCIA vets those who apply for membership, it demands that they insure themselves, it operates its own code of practice and has a customer protection plan. This provides subscribers with additional evidence of their reliability and is one of the benefits of membership. The value of this extra support depends on the perceived position of the NCIA.[11] This has changed over the years. When foam dominated there was indeed a national cavity insulation business. The introduction of fibre and beads changed the nature of that business and differences between materials producers and their installers have weakened the sense of common identity and undermined the potential for co-ordinated control.

The NCIA is funded by subscription and provides a range of services which directly benefit its members (approximately 15% of all installers belong). These subscriptions also allow the NCIA to function as "the national trade association for the total industry".[12] The three other trade associations have different priorities and commitments. EURISOL and the Cavity Foam Bureau are directly funded by manufacturing organisations and EPCIA is supported by subscription from six bead system designers. All have a general interest in monitoring installers but none are likely to risk market share by introducing and paying for additional programmes of surveillance.[13] In this context it is difficult to see how the industry could finance and enforce a national system of control or a national guarantee. Funding for such a scheme (by a levy on materials or on installations) would bear more heavily on some sections of the industry than on others and benefits would be just as unevenly distributed.

Control is, in any case, of great concern to individual manufacturers and systems designers, many of whom issue guarantees covering the product and its installation. Pilkington, for example, offer a 100 year guarantee, Walltherm provide a 30 year guarantee, and most other systems designers provide guarantees which last the lifetime of the building. Potential customers are believed to value guarantees and manufacturers and systems designers are prepared to spend money on inspection in order to support these guarantees and thus acquire another selling point. There is no need to go beyond this limit and customers do not appear to be worried enough about technical risk to bear the costs of additional surveillance.

Systems designers have other reasons for checking on their installers and much technical and financial inspection is a matter of simple self-interest. The trouble is that the costs of supervision are passed on to the final customer. Systems designers therefore have to determine technical standards and procedures for enforcement which provide adequate protection but which do not interfere with their installers' ability to compete. This is difficult: manufacturers may, for instance, encourage installers to systematically evaluate the risk of rain penetration. However, they cannot make installers turn down work by imposing demands

which exceed those set out in the British Board of Agrément certificate. Again the form and scope of control reflect the commercial nature of the relationship between supervising organisation and those they evaluate.

**Promotion**

Measures to control the industry either by restricting the numbers of approved installers or by restricting their activities can be seen as part of a programme to enhance the image of cavity wall insulation and expand the industry. Although important, control is not the only method of promotion. All trade associations engage in a range of promotional activities - pressuring government departments, working on European standards, issuing press releases, mounting exhibitions, producing literature and so on. In addition, each of the materials associations work on behalf of their member companies to foster the position of foam, of fibre or of bead. The scale of this activity reflects the scale and source of funding.

EURISOL, founded in 1962 as the "UK arm of EURIMA" (The European Insulation Manufacturers' Association),[14] has three members: Gyproc, Pilkington and Rockwool. EURISOL aims to "further the cause of energy conservation in the UK by promoting the benefits of man made mineral wool products" and its activities reflect this commitment. The three member companies fund all of EURISOL's work and have, in this way, helped to develop mineral wool as an insulation material. There is, for instance, a long history of support for research into the health of those involved in the manufacture and use of mineral fibre.[15] EURISOL has also sponsored research demonstrating the environmental benefits of mineral wool insulation, *Pollution Reduction through Energy Conservation*[16] and has funded a study of the public perception of insulation and green issues. The idea that each square metre of 50mm thick insulation "could save environmental pollution by $CO_2$ of 1 tonne over a 50 year building life"[17] applies equally well to all forms of insulation and EURISOL's promotional efforts are designed to increase sales of rolls, slabs and batts as well as blown fibre. EURISOL's members make more from fibre batts than from blown systems and have therefore concentrated on selling blown insulation to those involved with *existing* housing. As discussed in Chapter 2, manufacturers have worked hard to develop this market in order to compete effectively in the wider world of mineral wool insulation. The present dominance of fibre is in some part due to EURISOL's success in promoting glass and rock wool as materials for cavity wall insulation. That success is in turn related to the support provided by manufacturers motivated by interests which extend well beyond the business of cavity wall insulation.

By comparison, EPCIA - the Expanded Polystyrene Cavity Insulation Association - and the Cavity Foam Bureau are devoted to cavity walls. The Cavity Foam Bureau was formed in 1979 in anticipation of the developing scare about formaldehyde. It is supported by the materials producers, its income is closely related to UF foam sales, and all installers and raw material suppliers are members. Not surprisingly its first task was to defend UF foam and counter the fear of formaldehyde.[18] The Cavity Foam Bureau has lost these defensive functions and now works to stimulate demand for cavity wall insulation and to improve the market share of urea formaldehyde foam. It does this through its technical information and advisory service, and through exhibitions, publications etc. The extent of this service depends, of course, on the size

of the budget and that depends on the volume of foam sold. EPCIA, the newest of the trade associations, was set up in 1985 to provide a forum for technical debate and a base from which to market expanded polystyrene bead systems. Its members subscribe and, as with the Cavity Foam Bureau, resources for promotional activity reflect market share.

By comparison, the NCIA's promotional budget depends on the number of willing subscribers, not on the current market share of any one insulation material.[19] The NCIA has two promotional functions: one as a national pressure group, the other as a public relations company commissioned by its subscriber-clients. In its capacity as a national trade association the NCIA liaises with government departments and produces documents such as *An Update on Cavity Wall Insulation: An Opportunity to Reduce Pollution, Energy Costs and State Subsidies*, March 1989. This paper assembles arguments for all forms of cavity wall insulation and concludes with this summary of the NCIA's own promotional role: "Companies representing most of the industry work together through the National Cavity Insulation Association Limited to promote cavity wall insulation generally and co-ordinate marketing efforts."[20]

The Association provides a setting in which to address issues of common concern: to debate the value of energy rating schemes, to discuss the government's position on VAT, grants, Local Authority funding, and Building Regulations. This service depends on the support of 38 members representing some but not all elements of the installing business. Larger long established companies are in a better position to take advantage of the benefits of membership and are more likely to view subscription as a worthwhile investment. The Association relies on this sub-section of the installing population, and its industry-wide activities inevitably reflect their interests.

There is, nonetheless, a tension between subscribers' interests and those of the industry. These differences come into sharper focus as the number of subscribers drops. The NCIA depends on the continued support of its members and in return provides a range of promotional services which benefit only those who belong. In this capacity the Association seeks to distinguish between its members and the rest of the industry. So, for example, it encourages Local Authorities to specify NCIA membership on tender documents, it publicises membership lists and only allows members to make use of the national logo.

To summarise, there are few organisational contexts for active promotion of the whole cavity wall insulation industry. Three of the four trade associations are funded by manufacturers and others committed to foam, to fibre or to bead. In promoting their material these organisations promote cavity wall insulation in general, inadvertently investing in their competitors' futures as well as their own. This risk informs the promotional strategies of EURISOL and, to a lesser extent, the Cavity Foam Bureau and EPCIA. The NCIA's members have their own commercial interests and these similarly inform the nature and scale of industry-wide promotion. These internal divisions are important but the real constraint is money. Resources invested in national promotion relate to the volume of business and to levels of profit within the industry. As demand drops so too does the amount spent on promotion. This in turn has consequences for the nature and effectiveness of the industry's marketing strategies.[21] So begins the downward spiral of less work, less profit, less promotion, less work, and less profit.

## Control and Promotion

Manufacturers and installers both want to increase demand for cavity wall insulation. However, competition at manufacturer level makes it difficult, perhaps impossible, to introduce restraint and control of the kind which installers believe is required. Most installer respondents argued for an industry made up of a few carefully controlled and reputable companies doing more work, facing less competition and making greater profit.[22] This, of course, depends on a change of approach at manufacturer level, and few are likely to turn down opportunities to sell insulation material in order to protect the interests of handful of elite installing contractors.

In general, pressure for controlling the *number of installers* increases during periods of expansion, for example during the mid 1970s, and decreases when demand is slack. Although related, interest in controlling the *standards of insulation* follows a slightly different course, being designed to protect the consumer and to increase confidence in cavity wall insulation whatever the size of the installing population.

Several respondents argued for stricter controls on the grounds that this would rid the industry of its cowboy element. They wanted the British Board of Agrément to take a more active role not simply because there was bad practice but to ensure that it led to punishment and the elimination of unfair competition. Honest installers felt that they were paying for a certification process which did not differentiate them from neighbouring cowboys and which had little effect on the number of competing companies. As they saw it, British Board of Agrément certification was only effective in that it deterred prospective installers unwilling to pay what amounted to a tax on the industry. This seems unfair, but it is true that present procedures depend on systematic recording rather than on detective work and unannounced spot checks to catch out the cowboys, and it is also true that the British Board of Agrément would lose its customer if it applied its ultimate sanction and removed approval.

Manufacturers and systems designers guarantee installers' work. Their interest in the standards of workmanship and methods of control reflects a simple need for self protection. In this context supervision makes no difference to the number of installers or to the ferocity of the competition, but it may well make a difference to routine behaviour. Again manufacturers have no interest in applying any more controls than are necessary, and again sanctions are limited. Nonetheless, if the purpose of control is to ensure a minimum standard of technical performance, manufacturers' own self-interest may be enough to ensure adequate protection.

Developing this idea, several respondents argued that there was no real need for the British Board of Agrément or the BSI to monitor installers. This suggestion obviously threatens the stabilising and perhaps limiting effect of the link between approved system and approved installer. If this was broken, installers would be free to switch from one system to another subject only to the systems designers/manufacturer's willingness to guarantee their work. Manufacturers and installers would then have to negotiate new working relationships for the balance of interdependence would probably be subject to much greater short term fluctuation.

Discussion of these and other options underlines the lasting influence of the foam scares. Present methods of control are the direct descendants of those produced in response to periods of commercial and technical crisis associated with the rapid expansion and decline of cavity wall insulation in the late 1970s and early 1980s. Motives and positions become more and more tangled as time goes by and current debate about the nature and form of control builds on this already muddled mixture of arrangements.

It is easy to lose sight of the critical issues: why does cavity wall insulation need controlling, who benefits from control, and what are the terms of assessment? What, for example, is the significance of a laboratory test of the material itself? How does this test relate to a twice yearly inspection of the installing team? What are the limits of control and inspection at each stage and what are appropriate standards? What level of supervision provides an appropriate foundation on which to base a technical guarantee? Manufacturers are extremely interested in the credit-worthiness of their installers but this is not an issue for the British Board of Agrément. Financial security is important in terms of consumer protection but monitoring is almost exclusively technical. And so on.

These complex issues remain unresolved and the relative lack of attention paid to them is in itself instructive. In practice the question of control is quite straightforward. The industry has simply sought to control itself in order to promote cavity wall insulation and the very fact of surveillance and supervision has been at least as important - in marketing terms - as the chosen method of assessment. Surveillance, like promotion, costs money and current monitoring arrangements reflect the different, sometimes conflicting interests, of the British Board of Agrément, the BSI, the manufacturers, the installers and the end consumers themselves.

1 Respondents had extensive repertoires of cowboy stories featuring unscrupulous installers who "filled" solid walls, who were economical with the drilling, or who cheated on the material.

2 British Board of Agrément brochure, November 1989, p5

3 If insulation is to be installed in accordance with British Board of Agrément certificates the walls of new buildings "should be constructed in accordance with the relevant recommendations of BS5628". However, this is not a requirement of the Building Regulations and housebuilders do not necessarily meet these standards.

4 British Board of Agrément brochure, November 1989, p14

5 Said by one respondent to be around £10,000

6 There are no other recognised standards for fibre and bead systems design. Foam is covered by the BSI - BS5617 ensures that manufacturing companies are examined under the Registered Firms scheme.

7 The BSI system is so controlled that manufacturers cannot sell to unregistered installers.

8 Local Authorities, for example, can inform potential customers of installer's unregistered status. They do not need to tell installers that they have done so and this leads to cancelled orders and confusion. Recognising this danger, unregistered installers find ways around the bureaucracy in order to limit what they see as the Local Authority's capacity for arbitrary control. Respondents suggested that about a third of the industry is not British Board of Agrément or BSI approved but there is no way of checking this. The position is complicated as installers approved for one system might also be using others.

9 The British Board of Agrément does what it can to enhance this value and "gives regular presentations to Building Control Officers, specifiers and other influential figures in the industry on the importance of certification, increasing the value of Agrément Certificates in the market place", British Board of Agrément brochure, p14

10 The NCIA: objectives, facilities and achievements, January 1989, NCIA

11 The NCIA had a membership of 38 installing companies in October 1990. More than two thirds of these have been on the British Board of Agrément list for 8 years or more, and many have a history of installing foam.

12 NCIA paper, July 1988

13 The Cavity Foam Bureau is in a slightly different position because of the BSI which ensures that approved manufacturers only sell material to approved installers.

14 Design Manual for the Insulation of Building Structures, EURISOL, May 1986

15 Although never given as much publicity as UF foam, fibre has been associated with the risk of cancer for some time. Fibre fears come and go in the press and there have been a couple of recent mini-scares, one in spring 1989:
*Building Today*, 13 April 1989;
*Building Today*, 27 April 1989;
*Insulation*, May 1989:
and another in early 1990:
"Transatlantic row erupts over mineral wool risk", *Building*, 12 January 1990;
*Sunday Telegraph*, 7 January 1990;
*Sunday Telegraph*, 21 January 1990;
*Insulation*, February 1989;

*Construction Weekly*, January 1990;
*Building*, 18 May 1990;
*Building Enquirer*, May 1990;
*Energy Action*, May 1990.

16 This report was presented in May 1981. The pollution report is not dated but must have been produced between 1985 and 1989.

17 EURISOL, *Pollution Reduction Through Energy Conservation*

18 *Cavity Foam Insulation: Formaldehyde in Perspective*, was, for example, issued by the Cavity Foam Bureau to reassure householders in the years after 1983. This document presents "facts to help you take a balanced view" and ends with this paragraph: "Based on fact, not speculation, this leaflet has been produced by the Cavity Foam Bureau to put formaldehyde into proper perspective".

19 As fibre has come to dominate the industry, fibre interests have come to dominate the NCIA. Almost all member installers use fibre and most of the member system designers/manufacturers are involved with mineral wool.

20 "An Update on Cavity Wall Insulation: An Opportunity to Reduce Pollution, Energy Costs and State Subsidies", NCIA, March 1989

21 Some activities are easier to cut back on than others: it is more difficult to abandon an established telephone enquiry service than it is to cancel an exhibition. The form of promotion therefore varies as well as the sheer volume.

22 Others adopted a more complex position and argued that there would be greater demand if there were more installers drumming up work and, in the process, generating publicity for the industry as a whole.

## CHAPTER 4 MANUFACTURERS AND SYSTEMS DESIGNERS

There is no point in producing cavity wall insulation if there is no one to install it, so manufacturers depend on systems designers and installers. This chapter reviews the interests of manufacturers and of in-house and independent systems designers with reference to this interdependent relationship. What follows is based on interviews with five manufacturing companies, all of which had in-house system designers, and with twenty-four installers, four of whom were also independent system designers.

The manufacturer-installer relationship has implications for product development, for manufacturers' prices, and for promotion and control. In considering these issues the focus shifts from manufacturer as mere producer of insulation to manufacturer as system designer responsible for developing and fostering a network of approved cavity wall insulation installers. The chapter ends with a discussion of the role of independent systems designers, that is of companies which buy insulation material direct from manufacturers and sell that on for use with their own approved system.

### Manufacturers and Product Development

Whatever else, manufacturers have to produce a material which allows their installers to compete with those using other systems. Speed and ease of filling are key issues. The volume of material sold depends on the number of houses filled and that partly depends on the time required to complete each job.[1] Manufacturers have therefore concentrated on developing systems which involve less (or easier) drilling and which are quick to install. Early fibre systems were, for instance, especially cumbersome. Installers had to drill 2" cores or remove whole bricks, core drill bits were expensive, and it took time to repair the wall after installation.[2] These practical disadvantages put pressure on fibre manufacturers to develop materials and blowing machines and to produce systems which would allow their installers to match the performance of those using foam or bead.

Improvements in the density, quality and evenness of fibre followed. The installed density of rock fibre, for instance, has gone down from 80kg/m$^3$ in 1979 to between 35 to 50kg/m$^3$. Glass fibre[3] is now installed at around 20kg/m$^3$. Although manufacturers do not usually produce or own blowing machines[4] most have invested in machine-related as well as material-related research and development. The Gyproc/Wallthern system uses a special deflector nozzle, and Rockwool and Pilkington have developed systems using two and four nozzles respectively.[5] Ease of installation is just as important and installers have no time for machines which fail or for material which damages, clogs or blocks their equipment. Manufacturers respond to these demands in different ways: there is often room for economic as well as technological adjustment and prices can be set at a level which compensates installers for known difficulties.

Although the economics of installation are critical, installers are swayed by factors other than cost. Respondents held strong views about the technical merits of different systems and materials. These were wildly contradictory but the strength of feeling shows how important it is for manufacturers to create and maintain a good reputation within the industry.[6]

Installers sell as well as install and almost all look for technical characteristics which they can use as selling points. Fibre systems needed smaller holes not just because this made life easier for the installer but also because of customer preference. Similarly, urea formaldehyde producers have developed low formaldehyde formulations in response to customer-centred rather than direct installer-centred demand.

Finally, manufacturers have their own needs and interests and these also shape the course of technological development. For example, changes in the diameter of fibres and in the manufacturer's ability to control the length, quality, and density of the product reflect developments in the field of glass and rock technology. Research at this level is conducted in a variety of different contexts and involves those which produce as well as use fibre making machinery.

Certain processes are reserved for fibre destined to become cavity wall insulation.[7] Investment in these depends on the manufacturer's special interest in this field and that in turn depends on the approach taken towards the production of other insulation products, loft insulation, fibre batts and so on. Pilkington's shift to main line production of cavity wall insulation, for instance, is the result an extensive research programme inspired by the perceived need for better cavity wall insulation material in the early 1980s.

Rockwool, Pilkington and Superglass have testing rigs and can develop materials, methods and machines in the privacy of their own sheds. The use made of these rigs depends on the sums invested in development work and on the expected return, and in the present market manufacturers are as likely to concentrate on ways of reducing the cost of producing cavity wall insulation as on ways of improving its performance. And yet each needs to keep its installers supplied with material of as good a quality and/or value as that produced by its competitors.

**Manufacturers and Prices**

Most installers believe that manufacturers determine the cost of insulation materials and most manufacturers believe the reverse. This section considers the economics of cavity wall insulation from the manufacturer's point of view and concentrates, first, on the creation of a market for cavity wall insulation materials and, second, on the downward spiral of fibre prices.

Foam, fibre and bead have different economic histories. Foam was the first form of cavity wall insulation and has always been the least expensive of the materials to the installer. Foam provided an initial reference point and, as suggested above, manufacturers have manipulated prices in order to minimise or take advantage of differences between insulation materials. In that sense they have created a common economic framework in which installers compete. What is interesting is the relationship between the market for cavity wall insulation and the wider market values of each material.

Fibre prices, for example, have dropped relative to those of bead which is now the most costly product. The price of expanded polystyrene for cavity wall insulation relates to sums that

producers can get for the same material in different contexts. As demand for cavity wall insulation beads decreases the price relates more and more to the value of the same material in the wider market of expanded polystyrene.[8]

Manufacturers have to counter these material-specific trends if they are to continue to compete within the cavity fill context. Management of storage overheads illustrates the point. The cost of storage influences an installer's ability to compete and sell material in volume. Foam installers appear to have an advantage in this respect for resin and hardener take up comparatively little space, though they do need special storage and their shelf life is limited. Expanded bead takes up the same room in the installer's shed as it does in the customer's walls and storage represents a significant overhead which has to be accounted for somewhere along the line. This is less of a problem for fibre installers, but even these organisations need to be able to handle and store bales of material. Density and volume have other practical consequences. Companies using glass fibre can fill a van with enough material to last a week and can work away from home. Rock fibre installers therefore spend more on storage and transport than their glass fibre competitors but less than those using bead.

Manufacturers favour bulk buying but do not deliberately adjust rates to compensate for storage problems etc. Nonetheless, pricing policies minimise the effect of basic differences between materials, allowing installers using different systems to compete in the same market. Raw materials for rock and glass fibre have not gone down in price and yet Local Authorities and other volume consumers now pay less for cavity wall insulation than they did five and even ten years ago. The scale of British fibre production has increased dramatically during this period, with important consequences for the economics of cavity wall insulation. In theory, manufacturers can control the volume of fibre produced for domestic and export markets[9] and in that way avoid crises of over-production and falling prices. In practice there seems to be a pretty large fibre mountain - there are even rumours of manufacturers still trying to sell material produced in 1984! In re-opening the Stirling plant in 1987, Superglass added to the industry's capacity and to the volume of material on the market. None of this means that prices have to drop but competition for market share between fibre manufacturers has had this effect. For individual manufacturers, pressure appears to come from installers demanding lower prices in order to compete with those using other systems and other suppliers. Manufacturers' willingness to cut rates in order to sell material sets off successive cycles of price reduction. These have different consequences for different manufacturers and much depends on the importance of cavity wall insulation when set alongside other forms of insulation[10] and on the importance of insulation when set alongside manufacturers' other commercial interests.[11]

It is difficult to justify extra cost (to installers) on grounds of quality or customer preference because no one can be sure that customers will pay more for a better material - though they are clearly prepared to pay more for non-foam forms of insulation. Although quality has some value for installers working in the domestic sector and for manufacturers content with a small market share it is too intangible an asset to have any great impact on the overall picture.

To summarise, fibre manufacturers' need to sell as much of their product as possible. As there is no increase in demand, market share is all important. Arguments about quality carry little weight and the only way to really shift material is to supply installers at ever more competitive

rates. This pattern has implications for installers as well as manufacturers who despair about the downward spiral of ever decreasing profit margins. There is also much speculation about which of the four fibre manufacturers will be the first to go. These fibre price wars have implications for non-fibre systems and have helped to reinforce sub-divisions within the cavity wall insulation industry. In particular, they have widened the gap between installers competing for Local Authority work and those operating in the domestic sector.

**Manufacturers and Marketing**

Manufacturers promote their materials to specifiers and to system designers and installers. Examination of these promotional activities illustrates further dimensions of the interdependent relationship between installer and manufacturer.

The Local Authority market is a key target from the fibre manufacturer's point of view because that is the sector in which material is used in quantity. Marketing initiatives therefore focus on Local Authority technical staff and other specifiers, especially architects. Pilkington, for instance, produces a range of literature emphasising environmental benefits and Rockwool works just as hard to communicate with relevant technical decision-makers. All keep a close watch on Local Authority activity[12] and all support their installers' efforts to cultivate these very important buyers.[13] So there is a mixture of generalised drip feed promotion combined with quite precise marketing designed to convert and persuade small groups of apparently influential people. But, in the end, manufacturers have to rely on their installers for it is the installer, not the manufacturer, who actually secures Local Authority contracts.

Fibre manufacturers concentrate on selling fibre batts to housebuilders and do relatively little to promote blown fibre in this sector. Foam and bead producers do not have the same conflict of interest and promote their materials to housebuilders, albeit on a fairly small scale.

From the manufacturer's point of view, television advertising represents the only possible form of mass communication and all recognise that this would be as much use to their competitors as to their own installers. Although there are 8 million unfilled cavities in the domestic sector manufacturers do not directly seek to influence private householders.[14] Most provide or sell literature, videos[15], and advice manuals for installers to use in day to day canvassing but all conclude that direct promotion would be too costly and too unpredictable to be worthwhile.[16]

Whatever the context, manufacturers are typically torn between marketing strategies which focus on company name and those which concentrate on the current product range. This is an important issue which again has implications for systems designers and installers. Those which promote company name need to pass elements of their corporate identity on to installing organisations. And yet installing organisations are quite independent firms.[17] Approaches differ but manufacturers' in-house system designers make certain image-related demands on their installers. Installers' vans are thus painted in a particular way, and installers' teams are provided with manufacturer designed outfits, caps etc. Installers believe that they benefit from this association of identities and logos, and manufacturers are keen to carry the system's image and identity through to point of sale and installation. This way the

manufacturers' promotional investments (seminars, literature, free gifts, samples etc.) are visibly linked, via the installer, to the real process of selling.

Promotion of specific products is more difficult. The Local Authority survey described in the parallel report, *Finding the Gap*, reveals the extent of confusion between product and company name and between product name and generic material. Local Authority respondents blurred distinctions between Rockwool, rock wool, and Rockwool Energy Saver and were, in sum, pretty uncertain about the range of mineral fibre systems. Manufacturers work hard to tighten up specification in their favour but competing installers are often able to convert specifiers and persuade them to adopt similar but different systems.

Most manufacturers promote their own name and sell products packaged and marketed in these terms. An alternative route is to forego manufacturer-level identity and concentrate instead on supporting the status and presence of independent systems designers and their installers. Variants of the Superglass/Superwool label (ie. the manufacturer/material identifier) take second place to the system designers'/installers' identities and in this arrangement installers and independent systems-designers appear to have greater autonomy than those whose marketing activities are constrained by the manufacturer's requirements.[18]

In-house systems designers have to sell themselves to installers as well as to specifiers for success and market share ultimately depends on the quality of the installing network. Styles and approaches vary widely. At one end of the scale manufacturers are prepared to supply material to just about any installer who wants to buy it. In the short term this may increase sales but it does mean that installers compete with the same system in the same geographical area. At the moment, Pilkington installers are the most densely clustered, especially in the Midlands. Other manufacturers develop franchise agreements demanding close association and setting out a clearly defined structure of rights and obligations. So, for example, Walltherm, Thermocomfort and, until recently, Rockwool installers agreed to restrict domestic (but not contract) sales to a defined geographical area. In return, franchisers tacitly agreed not to take on new installing companies if that threatened the profitability of members of the existing network. The most extreme form of involvement is, of course, total ownership. Pilkington used to own Cosyworld and Cape had its own installer network, although Superglass/Encon is now the only manufacturing organisation to actually own installing companies. This arrangement is surprisingly rare, perhaps reflecting the tensions between volume-centred manufacturers and profit-centred installers.

Current manufacturer-installer relationships reflect positions along this scale and installers are full of stories about the support provided by their manufacturer/system designer. Manufacturers would not sell any material at all if there were no trained installers and all offer technical advice and instruction for installers' teams. Other forms of assistance such as advice and guidance on marketing and accounting, training for sales staff, financial contributions to yellow pages advertising, subsidies to secure Local Authority or Gas/Electricity board contracts etc. are provided in different measure depending on the manufacturer's approach and on the perceived value of such investment. Committed manufacturers aim to motivate their installers' sales staff but have no direct influence over these people and indeed have no part to play in the installer's business. Manufacturers are

also interested in their installers technical standards for it they who issue the guarantee. Again this means that manufacturers have to find ways of supervising staff over whom they have no formal control.

Ownership and control of machines is another interesting indicator of the manufacturer-installer relationship. Some manufacturers own and lease blowing equipment and maintain complete control over the number of machines in use; some develop and sell equipment to their installers; and others expect installers to buy appropriate machines of their own. In technical terms, systems have become less and less machine-dependent and manufacturers do not have the same level of machine-related influence as they once did.[19]

Not all manufacturers want to keep such a close eye on their installers. Indeed, some argue that franchise type relationships inhibit entrepreneurial flair. Installer support services are quite demanding and manufacturers may do better by reducing this overhead and the cost of their material. Again there is a catch. If installers go out of business because manufacturers have neglected to provide appropriate assistance, someone else is sure to pick up the surviving experience, contacts, contracts and orders and the manufacturer loses market share.

Although installers are independent companies they are often indebted to their manufacturing suppliers. Manufacturers are understandably worried about the credit worthiness of their customer-installers and the interdependent relationship is pushed to its limits when installers are unable to pay their bills. Manufacturer's responses are nonetheless influenced by the need to maintain an installer network and to avoid making decisions from which their commercial rivals might benefit.

There are other even more complex areas of potential conflict. Manufacturers are keen to keep their installers in business but are not especially enamoured of those who stay in business by setting one system/manufacturer off against another. And yet manufacturers cannot afford to refuse orders just because installers have British Board of Agrément certificates for other systems. Such objections are therefore set aside when there is an opportunity to sell insulation.[20]

To summarise, the business of producing and manufacturing insulation material is the least of the manufacturer's concerns. Maintaining and managing an effective network of installers is much more important for it is this which determines market share and profitability. This observation puts previous discussion of over-capacity and over-production in context. Some argue that there will be no end to the fibre price wars until one of the manufacturers pulls out and fibre production drops, or until demand picks up. But this is only part of the story, for control of installing expertise is what is really at stake. If a fibre manufacturer were to fail the battle would intensify as there would be a sudden glut of unattached installers waiting to snapped up by the remaining manufacturer/system designers.

Thus far discussion has concentrated on manufacturers and their in-house system designers. Manufacturers also supply independent system designers and this last section examines the part played by these organisations.

**Independent systems designers**

Independent systems designers create or modify a system (that is a machine for filling a selected material or type of material and a method of operation) and pay for that to be examined and approved by the British Board of Agrément or the BSI. These organisations then develop networks of approved installers whu pay to use the approved system. The system designer usually manages the distribution of insulation material and gains further income in this way. So, independent systems designers make a living as middle-persons: they sell the right to use an approved system and they take a cut for managing the sale and distribution of insulation material.

The decision to become an independent system designer is an interesting one. All those interviewed were once "normal" installers and all had seen an opportunity to improve their position by developing their own system, managing their own network of installers and (in some cases) shopping around for materials. This move represented a step towards greater independence and autonomy, providing a way of creating a company with a clear image and with its own identity. Installing organisations are usually indebted to the manufacturer/system designer whose system they install. System designers do not suffer from the same constraints and, as one respondent explained, installers contemplate becoming system designers when they have "delusions of grandeur".

These delusions can be expensive. It costs approximately £10,000 to have a system tested and approved and that is only the first step. Systems designers also need to ensure that there is enough suitably modified blowing equipment to supply their installers and they need to provide training manuals and a training scheme which will satisfy the British Board of Agrément. Acquiring a network of appropriately trained installers is itself a delicate, time consuming operation.

Independent systems designers are unable to match major manufacturers when it comes to large scale advertising or local authority promotion and although some have extensive networks of installers, few of these installing organisations are especially large. In other words, independent systems designers typically relate to small installing companies, many of which specialise in the domestic sector.

From the systems designer's point of view the aim is to develop a network of reliable and effective installers. It is important to note that a good installer network is not necessarily one which consumes an enormous volume of insulation material. In this context, volume sales are not quite as significant as they are for in-house manufacturer-based systems designers. As long as profit margins are high enough, independent systems designers can manage quite well with a network of profitable but relatively low volume installers. Success depends on recruiting and retaining successful installers and, in this context, detailed knowledge of the industry and of the people working within it is an important asset.

It makes little sense for member-installers to compete with each other as this tends to undercut profit margins. Independent systems designers therefore try to develop a national or at least regional networks of installers. This is often difficult as independent system designers tend to

have developed from close knit installing companies with a well established local base. If the network begins to fail so too does the system designer's income. Independent systems designers generally rely on small installers and inevitably extend credit to these particularly vulnerable companies. Systems designers order material from manufacturers and suppliers and, as middle persons, take some of the associated commercial risk.

The exact nature of this risk depends on the relationship between independent system designer and supplier. Some system designers buy material from a range of different sources. If systems designers are unable to strike a good deal or if manufacturers' prices rise these costs have to be passed on to the designer's installing network and, as a result, installers are unable to compete effectively with those using other systems - including those developed by the manufacturers themselves.

Other apparently independent systems designers are committed to using material from just one manufacturer. These "linked designers" are not in quite the same position as the manufacturer's in-house system designer because they are not exclusively devoted to securing volume sales and they do not share the manufacturer's corporate identity. The use of linked but not wholly owned system designers has certain advantages from the manufacturers point of view. Credit risks, training responsibilities and promotional obligations are passed on to these second layer companies and yet the manufacturer is sure of an outlet for the material. So, for example, Superglass sold glass fibre to four independent system designers for the first few years of its operation.

Systems designers like to promote their own name and identity: the ability to do so is often one of the reasons why installing companies seek to take on system designing responsibilities. And yet the independent system designer is simply not large enough to have any significant national impact on, for example, local authority decision-making. Several of those interviewed retained their own installing business and there was much debate about the advantages and disadvantages of this arrangement. On the positive side it meant that the system designer kept in touch with the day to day business of installation and was able to develop new methods and check out problems. On the other hand, the system designer as installer is in direct competition with the rest of the network and is in a position to set a price level and if necessary undercut the rates offered by others using the same system. This can, of course, be an advantage, and one system designer retained an installing interest primarily on these grounds.

Independent systems designers often administer guarantees and are, in any case, concerned about the standards of their installing companies. Inspection and supervision is a considerable overhead and there is always room for debate about how much surveillance is required or desirable. Those interviewed felt that they were able to keep closer control over their installers than were larger more anonymous manufacturer-based system designers and that, as a result, their installers were likely to provide a better service.

In becoming system designers, installers boosted their own status as managers and directors with responsibility for a collection of other companies and with indirect control over a much larger workforce: the idea of supervising others was as important as that of a distinct company identity. At one time independent systems designers had what was described as "a licence to

print money". Having got an approved system they were able to sit back and rake in the profit. The pressures of a declining market, however, are as concentrated on the middle person as are the benefits of a boom, and independent systems designers were anything but content. They were literally caught in the middle, unable to control the fate of their installers and unable to influence their suppliers.

1 It also depends on a steady supply of work.

2 Inventive installers developed their own methods of filling 2" holes. One, for example, mass produced sand castles of sand-cement, moulded to fit the hole exactly.

3 This difference is partly due to the quantity of shot or un-fibreized rock left in the material. This shot can also damage blowing machines.

4 Rockwool is an exception in that it owns blowing machines which are then leased to its installers.

5 As it happens, installers have not been especially keen on these multi-nozzle arrangements which can be "more bother than they are worth", especially when used to fill existing housing.

6 For example, one installer refused to use long fibre systems but was quite prepared to use granulated glass fibre. Others explained that they had abandoned one system and taken on another because of the quality of the product. Installers' views are discussed more fully in the next chapter.

7 The detail varies depending on the manufacturing process. However, all involve some sort of water repellent treatment and granulation .

8 The costs of production, meanwhile, relate to the price of oil.

9 Rockwool (part of Rockwool International) and Pilkington do not export at all. Gyproc and Superglass do.

10 The edge trim issue is especially important here. As mentioned earlier, the cost of edge trim depends on the company's accounting practices. If it is added as an overhead it increases the cost of producing rolls and slabs but counts as free scrap available for conversion to profit and cavity wall insulation. If the overhead is treated differently the scrap has a value. If there is relatively little scrap it may be impossible to

meet demand for cavity wall insulation in this way. It does not make sense to granulate prime loft product - treated with expensive resin - and in these cases it may be worth producing main line cavity fill (which misses out on the resin treatment).

11 Pilkington is, for example, involved in the glass industry, Encon in distribution, Gyproc in plasterboard products and Rockwool in Rockwool International.

12 Some, for instance, maintain data-bases of Local Authority housing improvement programmes.

13 This support comes in a range of different forms including financial subsidy as well as technical advice and sometimes free surveying.

14 Shell's national campaign to introduce bead is often quoted as one of the most successful manufacturer level initiatives, but that was in the early 1980s when investment in domestic sector promotion was believed to be worthwhile.

15 Pilkington, Rockwool and Gyproc have videos, some produced for technical rather than private customers, but all used in domestic contexts.

16 Manufacturers do, however, help installers get domestic work through the utilities and in this indirect way sponsor domestic sales.

17 Except for some installers which belong to the Encon group and which use Superglass based systems

18 The problem here is that there is no one name to push to specifiers - but if specifiers currently ask for mineral wool this is not much of a problem.

19 In theory the British Board of Agrément certification process prevents installers from simply switching from one manufacturer or source to another. It is, of course, difficult to enforce these conditions.

20 So, for example, Pilkington supplies rockwool to installers using the Thermatic Rockwool system. This system is managed by Talbot Thermatic, now Superwool Systems and part of the Encon group.

## CHAPTER 5 INSTALLERS

Installing cavity wall insulation would seem to have great potential for entrepreneurial achievement: it is relatively inexpensive to start up as an installer, it does not require lengthy training, it is practical to operate on a small scale, the product should sell itself on pay back alone, and profit margins can be quite impressive. Given hard work and a measure of business sense, success is guaranteed - or at least that is the expectation. The experiences of the twenty four installers interviewed during the course of the research suggest that this is a misleading picture. They also suggest that the alternative vision - one of fly-by-night cowboys, easy profits, and unscrupulous con men - is just as inaccurate.

Installing companies cater for different sections of the market and consequently operate in quite specific commercial environments. There are, nonetheless, certain common characteristics. One is that installing organisations are relatively small: only a few have as many as four teams, and installers rarely employ over 15 staff. The majority have one or two teams and are run by an owner/mangager and perhaps a partner. Several respondents described cavity wall insulation as a cottage industry and sought to explain why that pattern should have developed. Some argued that the business demanded such close control that it would be difficult to operate on any larger scale. Company management structures typically revolve around one or two key individuals and it is hard to expand or to extend geographically without changing this arrangement. Selling is labour-intensive and companies generally employ more administrative and sales staff than installers. Practices vary, but sales people are often employed part-time or on hourly rates, while turnover is high thus demanding constant co-ordination.

There are other constraints for successful expansion also depends on effective and continuous generation of work. The decision to go from two to three teams depends, for example, on the conviction that it will be possible to increase demand by 50% in the next few weeks and maintain it at that level long enough to cover the costs of an extra machine and another van. Installing companies are unable to predict their workload much more than a month ahead and although they can respond to immediate fluctuations in demand it is difficult to make longer term judgements or to justify longer term risks.

Finally, several respondents argued that the need for commitment set a natural limit on company size, expressing a real fear that the business would fail if it grew to the point where employees lost their sense of personal involvement and with it their willingness to work long hours. The image of a close knit family firm was often important, and five of those interviewed did indeed employ members of their immediate family.

None of these factors mean that installing companies *have to* be small but it helps to explain why most of them are.

Respondents had all sorts of reasons for setting up in business as installers of cavity wall insulation. Some were already familiar with cavity fill having worked in the industry before. Trained installers might set up on their own, partnerships often fragmented, and businesses were frequently acquired by previous employees. Marketing provided another route and the

installing population includes people with sales expertise who have "seen where the future lay" and moved into the field on the grounds that it offered the kind of potential they were seeking. One respondent had, for instance, surveyed a range of entrepreneurial opportunities and concluded that there were few other contexts in which the service element (ie. the installation process) added such value to the basic product. As he saw it there was profit to be made by installers who emphasised their service rather than the manufacturers' material. Others simply enjoyed the process of installing insulation and the seasonal cycle of hard working winters and comparatively slack summers.

Although motives and ambitions varied, most respondents aspired to be successful business people. Some had managed the transition from dining room table to executive office suite, others were sustained by this vision, and almost all were attracted by the idea of running and managing their own company. Although the scope for entrepreneurial creativity was perhaps more limited than many believed, there was certainly room for individual initiative and the daily realities of price negotiation, sales competition and commercial pressure reinforced the sense that success and failure depended on personal ability.

Double-glazing, spray coatings, floor finishing and small scale manufacturing provide parallel outlets for entrepreneurial ambitions, and installers were frequently involved with (and dependent on) a range of different markets and products. The important thing was to be in business[1] and cavity wall insulation represented one amongst other contexts in which individuals could set up as the managing director of their own company.

Small businesses are notoriously fragile and insulation installers were inevitably subject to fluctuations in costs and demand beyond their control.[2] Many of those interviewed felt that their existence - and that of others involved in cavity wall insulation - was especially precarious. But is the cavity wall insulation industry really more volatile than any other sector? Analysis of the British Board of Agrément lists of approved installers gives some indication of the rate at which installing companies come and go.

The number of British Board of Agrément registered installers has been remarkably steady, remaining at approximately 200 from 1984 though falling to around 170[3] in 1991. Although interesting this tells us nothing about mobility within the industry. Companies merge, new branches are set up, names are changed though businesses and people remain the same, and, of course, disappearance and closure does not necessarily imply failure. Nonetheless, analysis of company name gives at least some measure of the rate of change. Taking February as the reference point, I compiled a register of all companies featured on the British Board of Agrément approved lists from 1984 - 1991.[4] Having recorded start and, where applicable, finish dates for each company name it was possible to map entrances and exits to and from the industry over that period.

I could not tell which of the firms listed in 1984 had begun in that year and analysis of entrances therefore starts in 1985. Similarly, companies still going in 1991 may exist for any number of further years. Analysis of exits therefore ends in 1990.

This material can be presented in different ways. Consider the fate of the fifty one companies starting in 1985: sixteen of those lasted less than one year (ie. they did not show up in the 1986 list), five lasted less than two years, five lasted less than three years, five lasted less than four years, three lasted less than five years, four lasted less than six years and thirteen are still going.

Put another way, 68% of companies[5] started in 1985 were operating after one year, 58% were around after 2 years, 49% after three years, 39% after 4 years and 33% after 5 years. 25% were still going after 6 years.

This table shows the percentage survival rate of companies started in each of the years included in this study.

| | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Ave1 | Ave2 |
|---|---|---|---|---|---|---|---|---|
| N | 51 | 47 | 37 | 29 | 18 | 15 | | |
| 1 | 68% | 82% | 75% | 72% | 77% | 93%+ | 77% | 88% |
| 2 | 58% | 55% | 72% | 62% | 63%+ | | 62% | 75% |
| 3 | 49% | 46% | 51% | 34%+ | | | 45% | 63% |
| 4 | 39% | 38% | 24%+ | | | | 33% | 55% |
| 5 | 33% | 27%+ | | | | | 30% | 48% |
| 6 | 25%+ | | | | | | 25% | 45% |

Notes:

N = number of cavity wall insulation companies started in each year

+ indicates that these companies are still operating

Ave1 = Average percentage of cavity wall insulation companies surviving up to 1, 2, 3, 4, 5 and 6 years.

Ave2 = Average percentage of UK VAT registrations surviving up to 1, 2, 3, 4, 5 and 6 years.[6]

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It is interesting to compare these figures with those for the construction industry as a whole. Approximately a quarter of companies in the construction industry deregister for VAT after 2 years and a half deregister after five years.[7] By comparison, roughly a third of cavity wall insulation contractors disappear from the British Board of Agrément lists after two years with two thirds disappearing after five.

This confirms the suspicion that cavity wall insulation is a risky business, that the chances of disappearance are higher here than in the construction industry in general and certainly higher than the national average as measured by VAT registration. The most dangerous period for VAT deregistration and for disappearance from the British Board of Agrément list is between the second and third year but the risk is comparably greater in the context of cavity wall insulation.

This analysis disguises what seems to be a core of quite well established organisations and, perhaps more important, it disguises regional patterns of stability and mobility. Respondents working in urban environments appeared to face stiffer competition and company turnover seemed to be higher in these settings. Of course, such changes disguise stability within the installing population itself. The interview data suggests that many individuals have been involved with cavity wall insulation since the early foam period albeit in different capacities and for different companies. Some of these people are quite well known within the industry and in that sense the installing business is more stable than the company statistics would imply. Long standing relationships between installers and manufacturers are also important and the resulting allegiances, inter-dependencies and rivalries are of greater long term importance than the vicissitudes of individual company identity.

In detail, relationships between installing companies and their systems designers/manufacturers differ widely: some installers are important buyers of insulation material, some deal in small quantities, some are financially secure, others are not. Furthermore, manufacturers develop distinctively different arrangements with their installers. In general, however, installers are alike in that their livelihoods depend on the pricing and promotional policies of their manufacturers. Assuming other costs are broadly comparable, installers' ability to compete depends on the price of insulation material which is, of course, beyond their control.

The system binds installer to manufacturer and even where there is no formal franchise agreement installers are tied in certain important respects.[8] They make the most of the manufacturer's name and reputation when seeking work and it is often difficult to tell if they are selling the manufacturer's product or their own installation service. This is further complicated by the use of promotional material produced by the manufacturer and sold on to individual installers. Installing sales people extol the virtues of their material, and having developed a reputation on this basis, it is difficult to switch systems.

Manufacturers need to maintain an effective network of installers and the dependent relationship consequently works in both directions. Installing companies which threaten to defect to other systems are subject to heavy informal pressure and are sometimes able to take advantage of this in order to strike better deals with their manufacturers. Those who are approved installers of more than one system have greater room for manoeuvre and can trade one supplier/systems designer off against another. However, even these organisations have to live with the consequences of manufacturers' policy decisions about profit, market share and volume.

Installing respondents were often critical of high level price wars, arguing that "everybody suffers" from the downward spiral of fibre prices brought about by the manufacturers' "undignified" battling for market share. Others paid little attention to "what they do up there", recognising that materials represented no more than half of the final costs of cavity wall insulation[9] and that small percentage changes in the price of insulation material made very little difference to the success or profitability of their own business.

So, the common structure of dependence has different implications for different sorts of installer. Those who deal with Local Authorities tend to buy much more material than those operating in the one-off domestic market. This influences the relationship between installer and manufacturer and determines the practical consequences of their mutual inter-dependence. Although installers may fill cavities for private sector housebuilders, for Local Authorities and for individual householders, many of those interviewed had chosen to specialise in one or other of these markets. This is an important decision. Each sector has its own commercial environment and there is a sense in which those selling to householders have more in common with other "home improvement" companies than with those installing cavity wall insulation in the new build or Local Authority markets.

The next three sections consider the characteristics of each market sector.

**The Domestic Market**

Estimates vary but the average cost of simply securing a domestic sale is put at somewhere between £60 and £100. Those concentrating on this sector of the market inevitably devote most of their energies to the process of generating interest and converting leads into sales. Respondents held strong - and often contradictory - views about more and less effective sales strategies and most had experimented with a wide range of options. As one put it, "we've tried everything under the sun".

Yellow Pages advertising is often sponsored by manufacturers, some of whom have a standard Yellow Page logo to which the installer's name is added. Although none of the domestic installers would be without it, Yellow Pages adverts do little to distinguish one company from the competitors listed alongside and in that sense represents a method of advertising but not of promotion.

While some installers believed that newspapers were a waste of time - "they are in the bin the next day" - others ran regular adverts, often taking advantage of feature advertising in free local newspapers. Mail shots and leafleting were also widespread as was local radio advertising.[10] These forms of promotion may increase awareness of cavity wall insulation but there is no guarantee that competitions, prize draws and holiday offers will actually produce the necessary crop of names and addresses.

Slightly larger (ie. two team) installers and those especially committed to the domestic sector sometimes use other forms of promotion, such as in-store displays and caravan stands at county shows and local fairs. These methods are more secure in the sense that direct contact

is established between the installing company and the potential customer, but they are relatively expensive.

Door to door canvassing is even more costly though it is also more precisely targeted and more successful. Canvassed home owners are of course free to compare quotations but are already half-way hooked by the canvassing process which again involves direct contact between installing company and potential customer. Those using this method developed a detailed understanding of the physical and social geography of their locality. For example, one installer concentrated on older houses likely to be occupied by older people whose children had left home but who had not yet retired. Another focused on middle class areas in order to find the "discerning types" and, taking a different approach, one sent canvassers to working class areas where mortgage repayments were likely to be lower. In addition, certain neighbourhoods were known to be not worth bothering with having been "done" in the sense that they had already been canvassed.

Discussion of these methods and of telephone canvassing raised issues about the ethics of selling and respondents were keen to say where they stood, thus distinguishing between their own principled approach and that of their unscrupulous cowboys rivals. Opinions differed: some were strongly against door knocking, others recognised that cold calling had gone out of fashion but had no moral objections, and some were convinced that this was the most efficient method of generating interest. Even this group had their doubts about telephone selling and just about everyone drew a line somewhere.

More pragmatically, chosen promotional strategies reflect respondents' interpretations of the right balance between cost, security and probable return.

Personal recommendations generate the most secure leads in that the potential customer is already persuaded of the value of cavity wall insulation and is already convinced that the job should be done by the same company as that used by their friend, neighbour or relative. Installers usually have some method of rewarding sponsors and these informal commissions ranged in value from a bottle of wine to £20 and even £50. At the other end of the scale, the benefits of mass leafleting or newspaper advertising may be so diffuse as to have no mesurable result.

There was some pattern to preferred promotional strategies. The smallest installing companies and those for whom cavity wall insulation was one amongst other activities typically favoured generalised forms of advertising and personal recommendation. Larger and more devoted companies invested more heavily in selling, arguing that their efforts would eventually be rewarded and that the worse the market got the more they were obliged to spend on promotion. These installers sought to work all year round and although the winter was always a better time to sell insulation,[11] steady promotion ensured a trickle of work through the summer.

Whatever the initial approach, selling insulation to domestic customers is labour intensive. Having made contact installers then have to convert the merest glimmer of interest into a commitment to part with sums between £250 and £800. The conversion rate is usually

described as "one in three" at each stage, so a third of contacts result in appointments and a third of appointments produce a sale.

Installers have to get themselves invited into potential customers' homes if they are to stand any chance of success and sales techniques are inevitably influenced by this domestic setting. Having crossed the threshold, sales-surveyors shift the balance of power, turning the householder's living room into a stage for their own presentation. This is a delicate operation, and in performing it insulation installers make use of methods employed in many other selling situations. Sales experts lead potential customers from one stage of the selling process to the next[12] and here, as elsewhere, "it is talk that sells the product".[13]

The difference is that converted customers have nothing to show for their money.[14] The decision to insulate represents a considerable act of faith and those who buy cavity wall insulation buy little more than the promise of greater comfort, less condensation and lower fuel bills. Sales pitches are therefore designed to sell confidence, not insulation, for the aim of the exercise is get the potential customer to believe in the promised benefits.

The process of inspiring confidence involves much more than the presentation of technical information and salesmen develop very elaborate pitches, drawing on a wide range of images and ideas in order to convince potential customers of their integrity and thus of the value of cavity wall insulation.

Installers are well aware of the perceived qualities of insulation and adjust their presentations accordingly.[15] Comfort is, for instance, a much more important selling point than pay-back or fuel bill savings, both of which are complicated by the question of cost discussed below. "The environment" is another useful tool allowing customers to feel that they are doing their bit to save rain forests, limit $CO_2$ emissions and "help the ozone problem". Installers were unspecific and often wrong about the details but this made little difference: it was the image that counted. Installers also sold cavity wall insulation as a condensation cure. This was sometimes the focus of attention for householders who had tried any number of other remedies and who turned to insulation as a last resort. Not surprisingly, questions of rain penetration hardly ever cropped up and although manufacturers provide guidance and advice on technical matters, installers rarely made use of this supporting material. Videos and literature played a minor part in some performances where they featured as stage props, not as real sources of information.

Having sold their own credibility and with it the idea of cavity wall insulation, the next step was to sell the system. Here, arguments about the features and failings of different materials were important and installers distinguished between their service and that provided by their competitors on these grounds. The practice of knocking other systems was often condemned and frequently adopted. In the mythology, bead systems were a serious fire hazard, bonding was known to fail, and unbonded systems were bound to result in unwanted avalanches of loose fill. Glass systems never went in at the right density, fibres were too long or too short or too likely to be carcinogenic, and rock fibre was too heavy, too full of unfibreized shot and too prone to settle. Foam installers "played around with chemicals", concocting what was already known to be a dangerous material. And so on. Of course, these stories had to be used with caution: too much negative talk would undermine the professional style and there was always a

chance that the installer would want to switch systems at some point in his or her career. Positive features were therefore important and installers frequently observed that they used Fibre/Bead/Foam because it was the best or the original or the latest system available.

Company image is also significant since installers have to counter unstated concerns about cowboy contractors. Guarantees and insurance - some provided by the manufacture, some by the installing company itself - help to overcome these fears. The detail is not especially relevant and it seems that underwritten 30 year guarantees do the trick just as effectively as manufacturers' 100 year guarantees, or guarantees which last "the life of the building". Company history is also important, and those who can claim to have been installing for years take full advantage of this fact. On top of that careful presentation of professionalism and price help to bolster confidence. By asking a high price, installers suggest that their service and their company commands more respect than other cheaper competitors. Installers even argue that their especially high rate ensures their survival, thereby guaranteeing continued existence and reliability.

Each property and each customer is different and the perceived value of cavity wall insulation depends as much on the efficiency of the salesman as on the nature of the material involved. There is enormous scope for economic negotiation and installers' pricing policies reflect judgements about what the market will stand balanced by the need to maintain a steady flow of work and to cover costs. Most stick to a notional upper rate per $m^2$ and in that way disguise the arbitrary nature of their calculation. This approach also avoids embarrassing criticism from neighbours who discover that one has paid significantly more than another. In addition it prevents over-enthusiastic salesmen "taking advantage of old ladies" and securing higher commissions for themselves at the expense of the company's reputation. Customers are of course unaware of these considerations.

Price is central to selling but its importance has little to do with economic worth or with the rational calculation of value. The public is believed to be unaware of the market rate for cavity wall insulation - so much so that such a rate barely exists.[16] Insulation salesman exploit this situation, knowing that the only comparable reference point is double glazing. Having built up a perception of the worth of cavity wall insulation, salesmen can then cash in on the apparent bargain represented by the proposed deal.[17]

Arguments of the "we are in the area already" variety are also used in the "strategic management of economic reasoning" and again create the impression of a bargain offer. Domestic installers were not usually prepared to fill at Local Authority rates but sometimes negotiated for this kind of work as part of a domestic marketing strategy. In reality, there were no genuine economies of scale and installers were therefore prepared to count just about any location as "in the area" if it helped to convert a potential domestic customer.

Although some installers made much of the savings to be expected from cavity wall insulation, claims about pay-back were couched in the most general terms. This is not surprising. Pay-back arguments presume a relatively simple economic world in which the initial investment has a fixed known value and in which savings are similarly calculable. The initial cost of cavity wall insulation was anything but fixed and, as suggested, manipulation of price was an important

element of the selling process. The relative insignificance of detail also reflects the bluff and double-bluff which characterises the relationship between customer and salesman. One installer explained the rules of the game as follows: customers know that cavity wall insulation will save them money but do not mention this for fear that overt recognition of significant savings might inspire the salesman to quote a higher figure. The salesman knows that this is what the customer thinks and maintains the illusion of his own ignorance. The actual sums involved really do not matter: what is important is that the customer feels that he/she is getting a bargain.

In the domestic context the "actual" costs of material, labour, travel, office overheads etc. do not directly relate to the sums quoted because of the elastic profit margin. Installers do take account of, for example, "the rose bush factor" (those who have gardens, or an approach to gardening, which might interrupt speedy ladder work often pay more), travelling time, and inconvenience and they obviously pass on the cost of arranging finance deals.[18] However, such modifications make relatively little percentage difference to the final figure.

Respondents were careful to define their own professional approach[19] and to dispel any notion of the hard sell. Nonetheless, survival depends on generating leads and on converting them into profitable sales. Smaller installers do their own selling but those who run two or more teams usually have to employ canvassers (who make the initial contact) and sales-surveyors (who do the sales presentation, measure the property and provide a quotation). Terms of employment varied: canvassers were often self-employed and paid on commission, per visit, per hour, or per hour with a bonus for each converted lead. Self-employed sales staff were paid at different rates depending on whether they were pursuing their own lead or one provided for them by the company.

Canvassers and home improvement sales-people are part of a particular employment market in which mobility is endemic. People pass into and out of selling on their way to other jobs and career sales-people are constantly searching for better opportunities. At times the cavity wall insulation industry looks like a good sector in which to make money from selling and at times it does not. The task of managing, training and maintaining an adequate sales force is therefore quite demanding and even those employing their own sales people have to cope with a steady staff turnover.

Installing companies depend on the expertise of their current crop of sales staff and this puts them in a rather vulnerable position. Self-employed salesmen can sell leads (ie. names and addresses) to competing installers and in that way re-distribute the balance of business. In other words, there is a going rate for information about people likely to be interested in cavity wall insulation and when times are bad sales staff are able to get a higher price for this commodity.

So what is it that makes times bad? There are an estimated 8 million empty cavities in the domestic sector and yet installers have found it increasingly hard to create enough demand. Of course not all that 8 million genuinely constitute a market for the real market depends on the social and financial position of the occupants not on the physical structure of their property. Installers were aware that some areas had reached saturation point because too few of the

houses with empty cavities were owned by people willing or able to pay to have them filled. There is, nonetheless, a marginal population of home owners who have cavity walls and who might be persuaded to have them filled.

Installers had their own theories about why it was so difficult to find these people and about why selling was now such hard work. Government disinterest, consumer lethargy, changing interest rates, fuel prices, and weather were the most common culprits.[20]

Descriptions of economic obstacles were characteristically complicated. On the one hand, installers argued that householders did not mind paying a few more hundred pounds (for a good service, for a particular material etc.) when they were so pleased to find that the price was lower than expected. On the other hand, installers argued that the market would only open up if VAT was removed, if insulation qualified for tax relief, or if fuel prices suddenly increased.

It is important to recognise the symbolic significance of these apparent economic factors. It is not really the money that is at stake. If VAT were removed installers would exploit VAT exemption as a demonstration of government confidence in cavity wall insulation - any real reduction in price would barely notice. Responses to the idea of government grants were similarly complex. Some respondents favoured the notion on the grounds that however small the sums involved the decision would inspire confidence and would, additionally, imply that there was a bargain to be had. However, most were against taking promotion this far, fearing that such a step would attract the cowboys back into the business and reduce profit margins as fast as it increased demand.

Installers were understandably wary of precise statements about pay back for these, of course, imply an equally precise estimate of the cost of cavity fill. Protection of a very flexible market rate is all important for installers needed to manipulate the perceived worth of their service. Respondents recognised that it was difficult to persuade householders of the value of cavity wall insulation when fuel bills did not represent a significant financial burden. And yet customers' calculations involve comparison between estimated fuel bill savings and a quoted capital cost which the installer pitches at a level he or she hopes the market will stand.

So, the vocabulary of rational economics is as misleading when used by installers as it is when used by their potential customers. That is not to say that real money is irrelevant, only that perceptions of value and calculations of profit and benefit are socially complex and often irrational when viewed in simply financial terms.[21]

Vague arguments about the national interest and global environmental change were useful promotional devices and domestic installers welcomed authoritative reference points around which to hook their sales pitches. The Monergy campaign had provided such a focus and installers often suggested the need for a green sequel which could be used as supporting evidence and which might generate new interest in insulation.

In summary, installing companies concentrating on the domestic sector rarely have more than two teams and while some were extremely successful, others were extremely precarious. Their

fate depends more on their own sales expertise and on the rise and fall of local domestic markets than on the decisions and actions of manufacturers and systems designers. In all these respects they differ from companies concentrating on contract work.

**The Local Authority Market**

Eight of the companies interviewed relied on contract work for Local Authorities and on contract arrangements with the utilities. These organisations needed to "keep the tonnage up" if they were to survive and to do that they needed to secure a steady flow of large contracts.

Local Authority work is unpredictable in that it depends on government funding for housing rehabilitation and/or energy saving initiatives as well as on the Local Authority's own priorities. Installers are therefore unable to predict either the scale of Local Authority work or its timing. Invitations to tender typically increase towards the end of March as Local Authorities look for ways of spending unused resources. However, these financial seasons are unreliable, and installing contractors have to cope with extreme fluctuations.

Larger installing companies are better able to manage the volume of work represented by a major Local Authority contract but in order to stay large they need to maintain a steady flow of work in an inherently unpredictable environment. This sets the scene for considerable competition between installers, many of whom are prepared to travel long distances in order to get work. It is obviously easier to operate close to home and companies only widen their range "when things get tight". Incoming competitors are therefore especially desperate for work and local installers resent what they see as this unfair competition. But what is "home" for one is "away" for another, and everybody travelled.

Although no one can influence the volume of Local Authority funded insulation, installers and manufacturers work hard to influence its distribution. Individual installers establish and cultivate personal contacts with relevant Local Authority staff and "bugs" (decorative lumps of fluff with wobbly eyes), mugs, pens, diaries, desk clocks and pencils all play a part in this process. This social investment is lost each time key contacts change jobs and installers often complained about staff turnover within Local Authorities or within Gas and Electricity boards. Manufacturers are also involved in these courtship rituals and often accompany installers on informal visits to chat with key decision-makers. Competition between the main fibre producers revolves around Local Authority contract work and successful conversion of a Local Authority is a real coup. No wonder, then, that manufacturers offer seminars and lunches at which they hope to persuade Local Authority staff of the technical qualities of their system and of the professionalism of their installer's service.[22] The scale and form of promotional investment depends on the Authority's current approach to cavity wall insulation. Basically, there are three options.

One is that the Authority is simply against cavity wall insulation. In this context, installers and manufacturers try to overcome the fears and prejudices of technical staff. This is not always easy for technical experts often hold strong personal convictions about the risks of rain penetration, brick spalling etc. - "It is like banging your head against a brick wall" said one unhappy installer, resigning himself to wait until the offending architect died! Alternatively, the

Authority might fill cavities but with a competing system. In this case the installer's aim is to get the Authority to change or to at least loosen its specification. Finally, the target Authority might fill cavities specifying only that the work be done by British Board of Agrément approved installers using British Board of Agrément approved systems. In these cases installers and manufacturers aim to secure tighter specifications. Although some Authorities stick to one precisely specified system, many invite and consider tenders from a range of installers, each offering a different system.

The installer's first task is thus to get on the tender list. The ensuing process of bidding for work involves careful estimation of the competition and of the costs of insulation. At the time of the research there was not much work to go around and installers kept a constant watch on each other's activities and on each others prices. The tendering process is much more public than the sitting-room deals struck in the domestic sector, and the results are of as much interest to manufacturers as to installers for both need to secure Local Authority contracts. Although their interests are alike in this respect, there is a catch. Manufacturers want to maintain the price of their material while installers want them to reduce it, selling at a special rate which will allow the installing company to get the job without further reducing its own profit margin. Special rates disrupt the normal discount-for-volume pricing structure and manufacturers who make special exceptions run the risk of upsetting their other installers. Special rates have other consequences. Installers losing contracts to competitors supported in this way put further pressure on their own manufacturer to follow suit for they cannot survive in the Local Authority sector if they are unable to buy material at a rate which allows them to match competitors' quotations.

Respondents were caught up in these exchanges and although they were highly critical of "silly prices" they were entirely enmeshed in the system which produced the downward spiral. As described, competition was so fierce and margins so tight that installers would lose out financially if they had to stop to repair a tyre. Accounting was a constant preoccupation and estimates were usually built up from careful calculation of real costs. Installers were therefore familiar with their own overheads and often amazed at the rates charged by others. Phrases like "I don't know how they do it" were common, indicating that it was impossible to do the job properly for the quoted rate. Other pricing policies were described as suicidal and constant under estimating did indeed lead to some commercial disaster. In following this fatal course, suicidal companies made life dangerous for other organisations which were obliged to cut margins in order to compete and which unwittingly put themselves in ever more vulnerable positions.

Installers were also critical of Local Authorities, claiming that technical staff should know better than to go for the lowest rate. These complaints were especially forceful when the successful opposition was from outside of the area. There were, for instance, several stories of companies which had come in and done a bad job leaving the Local Authority with "its fingers burned" and with no option but to invite the local contractor back to resolve the situation - at a price.

Precise financial estimates were clearly important because of the very low margins involved. This put much greater pressure on those responsible for measuring, for calculating - and

guessing - the widths of cavities, and for inspecting the cavities themselves. Installers were sometimes expected to quote for inspection as well as filling, sometimes just for filling. The costs of inspecting and cleaning cavities were the jokers in the pack - an allowance had to be made but no one could really predict the work involved. These factors might, nonetheless, make all the difference and some installers suspected that they had lost contracts because they were too accurate and too honest in their estimating. Decisions about whether to fill doubtful cavities raised especially difficult ethical problems for straight installers who felt themselves pushed towards the boundaries of cowboy behaviour. Others admitted that "you just couldn't work" if you did not cut some corners somewhere. As one respondent said, "we get caught out whatever we do": those who base estimates on accurate measurement lose out because of the time this takes; those who guess, lose if they guess too high and fail to win the contract and lose if they under-price the work.

Sales, promotion and estimating is typically handled by one or two key individuals and large contract-based installing organisations do not usually have sales forces of the type required for door-to-door canvassing. Such companies are especially interested in arrangements which allow them to work in the domestic sector but which do not involve them in the selling process. Gas and Electricity boards are, for their part, keen to promote cavity wall insulation and to make use of their own marketing potential.

Several respondents had won contracts to fill domestic properties for customers identified by Gas or Electricity board sales staff. Successful contractors agreed not to do any direct promotion themselves and, in return, entered into a contract which specified a standard rate for filling. The actual volume of utilities-generated domestic work is obviously unpredictable but as far as the installer is concerned the percentage profit margin is stable. Utilities contracts were much sought after for this reason and because the volume and timing of work did not depend on local government finance.

To summarise, Local Authority centred installing companies are relatively large and although profit margins are slight, turnover can be high. Several of those interviewed had acquired relevant symbols of status and success: a BMW, plush new office accommodation, etc. These people were managers more involved with training and hiring installers than with the daily work of drilling. Although subject to forces beyond their control, to fluctuations in Local Authority funding, and to sudden shifts in manufacturers' pricing policies, company directors were able to look beyond the minimum six week horizon. Indeed, it was essential to do so in order to retain appropriately trained staff, to secure adequate storage facilities, and to manage and maintain the necessary machines and vehicles.

**The Housebuilding Market**

Installers concentrating on the housebuilding market have more in common with Local Authority contractors than with those committed to the domestic sector but there are, nonetheless, significant differences.

The rates for filling new houses have remained higher than those associated with large Local Authority contracts. This is partly because housebuilders deal in smaller numbers - few con-

tracts are for more than 50 houses at any one time - and partly because the cost of cavity wall insulation depends on the housebuilders' approach to building economics. Installers described different experiences: some found that housebuilders simply chose the cheapest tender, others went to great lengths to explain why personal contact and loyalty counted for more in the new build sector than in the Local Authority context. This apparent inconsistency reflects differences between housebuilders. Buying and specifying practices vary systematically depending on size, history and market sector. So, for example, smaller housebuilders were quite likely to develop long standing relationships with local installers and were just as likely to pay more as a result. In this context, installers are able to compete with bead systems as well as with foam and fibre.

The 1982 building regulations increased interest in blown or injected cavity wall insulation and several respondents entered the new build market at that point. Subsequent changes have had similar effect though some complained that "these new regulations have not done us any good" arguing that the trade off option let builders "off the hook". Housebuilders can meet the building regulations in a number of different ways and installers therefore compete with those selling fibre batts and blocks as well as with those offering other systems for blowing or injecting cavity wall insulation.[23]

Local Authority contractors concentrate on competing for work rather than on stimulating demand. In contrast, new build contractors appear to spend as much time trying to persuade housebuilders to fill cavities as they do trying to convert those already using a competing system. Some builders are so set against the idea of filling cavities that they adopt more expensive methods in order to avoid any risk of rain penetration. Installers claim that retrofit cavity wall insulation represents the most economic method of achieving the necessary standards and catalogue objections to other approaches. As they explain it, wide and crumbly lightweight blocks are expensive and difficult to lay; fibre batts have to be bought in advance, stored and fitted into place piece by piece, and partial fill systems demand even greater care and attention. Once installers had persuaded builders to "sit down and listen" they were often able to make an economic case for their service. However, they still met with principled resistance from those unwilling to fill the cavity. Rain penetration was the subject of much debate as several respondents had been summoned back to inspect damp properties. All claimed that problems were due to bad building rather than to insulation and all felt unjustly accused. However, walls were known to silt up over time and installers recognised that the risks of complaint were higher during the first few months of the building's life. The process of attributing responsibility is so complex, however, that few installers turned work away on the grounds that it presented an unacceptable risk.

It does not take as long to fill a new house as it does an existing one because the holes are drilled from the inside. This means that there is no need to put up ladders or to match the mortar and it means that is relatively easy to fill using more than one nozzle at a time. In addition, the weather does not interfere. All this makes new build installation quite an attractive prospect. However, builders were not generally thought to be good customers. Several respondents had given up working in this sector because builders had gone bankrupt or had expected discount after discount or had simply taken too long to pay. Again it is important to recognise that the new build market is not homogenous: small builders do not relate to

installing contractors in the same way as larger volume housebuilders, some of whom have long standing connections with specific insulation companies.

Selling depends on personal contact and on the unremitting pursuit of leads gleaned from contract journals and although this is time consuming it is not as demanding as domestic canvassing. New build contracts are usually relatively small and domestic installers can move into and out of this sector without making any radical change to their normal pattern of work. The new build market therefore represents one of the few contexts in which non-fibre installers routinely compete for contract work and it consequently attracts some of the larger domestic-centred installers. Five respondents were exclusively involved in the new build market, preferring this environment to the ultra competitive Local Authority market and to the sales-intensive domestic sector. These organisations are directly dependent on the housebuilding industry and when it is in decline new-build installers have no option but to wait for things to pick up again.

**Insulation installers in summary**

The most important thing about installing contractors is their size. Cavity walls are insulated by very small firms typically run by one or perhaps two people. These entrepreneurs have to acquire a full range of financial, technical and sales skills and have to develop ways of responding to a relatively unpredictable flow of work. In these respects they are no different from many other small businesses. Analysis of data from the British Board of Agrément suggests that insulation contractors are more vulnerable than other small companies and that the risks of failure are greater. In this context the boundary between unsuccessful entrepreneur and unwitting cowboy is often blurred since many (but not all) cowboy characteristics are also essential ingredients for honest success. This is especially true in the domestic sector where selling involves persuading potential customers of the promised benefits of cavity wall insulation. Confidence is all important and installers have to employ a range of confidence building techniques in order to make a sale.

Personal abilities in selling, accounting and installing clearly make a difference to the relative success of small cavity wall insulation companies. However, even the most effective installers are constrained by factors beyond their control. The three sections of this chapter: "The domestic market"; "The Local Authority market" and "The housebuilding market", illustrate some of the pressures associated with each sector. Domestic installers, for example, rely on the number and quality of their sales-staff, on public perceptions of cavity wall insulation and on the availability of disposable resources. The livelihoods of Local Authority centred contractors are much more closely tied to manufacturers' pricing policies and to national and local government decisions about housing improvement. Those operating in the new-build sector are similarly dependant on government policy, on building regulations and on the state of the housebuilding economy.

Within these contexts each installer competes for business by creating and selling confidence, by adopting competitive prices and practices and/or by developing personal contacts. Approaches vary in each market sector but in all cases the business of selling cavity wall insulation is a commercial enterprise involving the careful manipulation of price and faith.

1 Dick Hobbs, *Doing the Business*, 1989, Oxford, Oxford University Press

2 Curran and Stanworth highlight this relationship in their discussion of small businesses: "Small enterprises, much more than their large counterparts, are at the mercy of market influences because they are small and have little control over the environment", Curran and Stanworth, "The Social Analysis Of Small Business", in R Scase and R Goffee (Eds), *Entrepreneurship in Europe*, 1987, Croom Helm, p170

3

| | |
|---|---|
| 1985 | 241 |
| 1986 | 215 |
| 1987 | 218 |
| 1988 | 216 |
| 1989 | 211 |
| 1990 | 175 |

4 This was interesting in its own right for the list provides a valuable insight into the presentation and marketing of insulation.

5 16 left out of 51 leaving 35 which is 68% of 51

6 Data from Michael Daly (Department of Employment), "Lifespan of Businesses registered for VAT", *British Business*, 3 April, 1987

7 Data from Michael Daly (Department of Employment), "Lifespan of businesses registered for VAT", *British Business*, 3 April, 1987

8 Curran and Stanworth discuss the similarities between "independent" and franchised business: Curran and Stanworth, "The Social Analysis Of Small Business", in R Scase and R Goffee (Eds), *Entrepreneurship in Europe*, 1987, Croom Helm. In their account, franchise-type arrangements are likely to develop where "economic activities involve divided economies of scale", that is where there are "advantages in, for example, a national image" or "large scale purchases of raw materials" and where customer service is "highly personalised" leading to "dis-economies of scale". The franchise system thus makes it possible to "exploit fully economies of scale at each level within the vertical chain of production and distribution from raw materials to final provision for the consumer", p175

9 The relationship between material costs and the cost of installation depends, of course, on the market sector: the cost of material is much less important in the domestic sector than it is for those doing contract work for Local Authorities.

10 All those interviewed in East Anglia made use of radio advertising, probably as a result of the radio company's own marketing strategy.

11 All installers concentrate on winter-selling, some making a special effort in the weeks following Christmas (people visit each other during the cold holiday period and so

discover the benefits of insulation) and some pursuing leads after each issue of quarterly fuel bills.

12 These steps are so well defined that practised salesmen can say with some conviction "If I get a cup of coffee I know I've got £600"

13 Trevor Pinch and Colin Clark, "The Hard Sell: 'Patter Merchanting' And The Strategic Reproduction And Local Management Of Economic Reasoning In The Sales Routines Of Market Pitchers", *Sociology*, Vol 20, No 2, May 1986, p169

14 One installer used to provide inscribed brass plaques so that his customers would have at least something to show for their money. He soon abandoned this practice recognising that there was little value in providing such an extra for householders who were prepared to have their houses filled. The plaques, each of which had cost him £6 quickly became too grubby to read and so had no wider promotional value.

15 As others have noted, sales people "routinely become convinced of the accuracy of their assumptions. For one thing, clients do not overtly contradict assumptions, and consultants interpret any absence of challenge as legitimating their framework. ...The very nature of the system creates an appearance of client acquiescence and consultant accuracy in predicting responses", Michael Katovich and Ron Diamond, "Selling Time: Situated Transactions in a Noninstitutional Environment", 1986, *The Sociological Quarterly*, Vol 27, No 2, p259

16 Some respondents were prepared to publish a rate for filling, for example, a two bedroomed semi. Others disapproved of this practice which clearly limited their own price setting. Rates quoted by Gas and Electricity board contractors were especially important in this respect and one installer felt that he could not "in all honesty" go above these.

17 The technique of building and dropping price to create the sense of a bargain is exactly the same as that used by market traders: Trevor Pinch and Colin Clark, "The Hard Sell: 'Patter Merchanting' And The Strategic Reproduction And Local Management Of Economic Reasoning In The Sales Routines Of Market Pitchers", *Sociology*, Vol 20, No 2, May 1986

18 At domestic rates, cavity wall insulation costs between £250 and £800. Several respondents believed that this figure was too large a sum to be readily available (at least in some contexts) and yet too small to be worth taking out a full-scale loan. Finance deals helped to resolve this dilemma.

19 One respondent was, for example, especially keen to explain that his company would never go in for evening sales visits because it was unethical to measure in the dark.

20 Technical worries only deserve a footnote. One installer complained about the damage done by architects and other "technical experts" who sowed seeds of doubt in the minds of otherwise "normal" customers.

21 The last chapters of R Anderson, J Hughes and W Sharrock, *Working For Profit: The Social Organisation Of Calculation In An Entrepreneurial Firm*, 1989, Avebury, review "creative accountancy" and "practical pricing" in the food industry. Much of their discussion would apply just as well to insulation.

22 The theory that good companies do not sell "duff stuff" was as important here as in the domestic context and these presentations were also designed to inspire confidence

23 The NHBC rules prohibit cavity wall insulation in Scotland.

## CHAPTER 6 FILLING THE GAP

There are an estimated 8 million unfilled cavities in the private sector and another 4 million in the public sector. It will take at least 60 years to fill these properties at a rate of 200,000 installations a year and it is in the national (and global) interest to speed this process up. These figures are the stuff of government policy and although useful for some purposes they are dangerously misleading when used to inform promotional initiatives.

There may well be twelve million unfilled cavities but it is important to recognise that many of these are owned by people who are simply unable to have them filled and that even the most persuasive promotional programme will fail when addressed to home owners who do not have the means to respond. There is therefore a smaller population of owners who are actually able to fill their cavities and who might be persuaded to do so. Furthermore, some of these potential fillers will require much more persuasion than others. Seen in this way, unfilled cavities fall into one of three categories: those owned by people who cannot afford to have them filled, those owned by people who could be persuaded if subjected to an unreasonably expensive promotional programme, and those who would respond so readily that promotional investment would prove to be cost effective.

It is, of course, difficult to know how many properties fall into each category. Assuming, however, that at least some (though not twelve million) are owned by people who can be persuaded to spend money on cavity wall insulation, how is that target population best addressed? What is the most effective method of promoting cavity wall insulation given the present structure of the industry?

This question is still too simple, however, for it is clear that there is no one industry and no one market. Householders, housebuilders and Local Authorities have characteristically different priorities and it is important to distinguish between these sectors.

What, then, can be done to encourage *private householders* to have cavity wall insulation? The first two chapters of this report set the question in context. There was a time when householders needed very little persuasion and when entrepreneurs were able to make significant profits from installing insulation. In this context it is interesting to speculate on the ways in which the industry might have developed had it not been for the formaldehyde scare. How long could sales have remained at the levels achieved in the early 1980s and what might the picture have been like if the industry's expansion had not been interrupted by the type relaxation issue of 1975? We shall never know. However, it is clear that these events put greatest pressure on small domestic centred installers. Those which survived tended to be slightly larger organisations better able to cope with fluctuations in domestic demand because of their involvement with Local Authority and other contract work.

The development of glass and rock fibre has also shaped the structure of the industry with manufacturers encouraging their installers to secure major Local Authority contracts in order to increase market share. The industry has therefore shed many of its small installers and those remaining have edged away from door-to-door canvassing, day time drilling and night time selling. Some would argue that this is a good thing but in losing its foundation of very small cowboy contractors the industry has also lost its footing in the domestic market.

Private householders are not buying cavity wall insulation as fast as they used to because fewer installers are selling it to them. It is not that the price is too high or the pay-back period too long - domestic decisions are not usually determined by rational calculation. Nor is it that there are persistent fears of rain penetration. As described, technical evidence has a very marginal part to play in the selling process. So the way to increase sales in the domestic sector is to increase the number of sales persons. The challenge here is to bring back small scale operators and encourage home improvement sales experts to exercise their entrepreneurial skills. Domestic selling is labour intensive and geographically specific. Expansion in this sector therefore depends on an increase in the number of very small locally based installing companies.

It is difficult to think of anyone in the industry who would welcome such a scenario. Most belive that the future success of cavity wall insulation depends on eliminating cowboys not on inviting their return. Control is a serious issue and the motives for control deserve serious attention, for it is difficult to distinguish between protectionism and concern for consumers or for the fate of Britain's housing stock. Differences between insulation systems are decreasing and the logic of linking approved installers to approved systems becomes less and less persuasive as technologies converge. If this link were broken, ties between installer and manufacturer would loosen, making it even easier to move into and out of the business. Would the industry spin out of control if installers no longer needed British Board of Agrément or BSI approval? It is an interesting question in that most manufacturers already issue guarantees covering the material and its installation. These technical assurances do not, of course, protect unsuspecting consumers from financial exploitation, but then that has never been the issue. In sum, it is difficult to believe that an invasion of appropriately guaranteed cowboys would really harm the national cause of energy efficiency. Indeed such an invasion would seem to be a precondition for any significant increase in the domestic market for cavity wall insulation.

Private sector housebuilding presents a different problem. Builders have to comply with the building regulations and can do so in a number of different ways. In this context, the decision to opt for cavity wall insulation (rather than any other solution) makes hardly any difference to national energy consumption. It does, of course, make a difference to the insulation industry. The volume of work in this sector depends on the volume of housebuilding activity and, to a lesser extent, on housebuilders' perceptions of technical risk. Although of marginal national importance, this is an area in which technical evidence and guidance might increase the use made of injected cavity wall insulation.

As described above, events have conspired to favour slightly larger contract orientated installers. The industry is thus better placed to tackle the 4 million unfilled cavities in the public sector. But not all Local Authorities can afford to fill all of their empty cavities and only a percentage of the 4 million are owned by organisations with the resources to act. This percentage is essentially a function of national finance and local priority. Perceptions of technical risk may complicate this simple equation and some Authorities are resolutely set against the measure. However, public sector demand for cavity wall insulation typically depends on the resources devoted to energy improvevments in housing. Additional injections of money - such as those associated with the Department of the Environment's Energy Demonstration (or "Greenhouse") programme - can therefore have immediate effect on the

number of cavities filled in the public sector. For example, it would have been possible to fill all empty public sector cavities for less than the £60 million committed to that programme. Major expenditure in this sector inevitably raises fears of cowboy behaviour and there is a delicate balance between taking advantage of manufacturer level competition and taking on cowboy contractors. Questions of control are also rather different in this sector as compared with the domestic market. Local Authorities generally deal with a handful of larger contractors and are usually able to make sure that they get the best possible deal by inviting competitive tenders. Local Authorities are unlike private householders in that they are important repeat buyers and they are not usually interested in house by house guarantees. Because the focus is on relatively few, relatively large, installing organisations, routine inspection represents a viable form of control. In this environment, installing companies cannot afford to be caught out.

So, householders are unlikely to buy cavity wall insulation unless there is someone to sell it to them. Home improvement sales experts are not currently attracted to the cavity wall insulation business and the present arrangement of interests within the industry inhibits promotion in the domestic sector. Existing installers are unlikely to encourage further competition and there is no incentive for manufacturers to devote themselves to the low volume installer. The Local Authority sector looks more promising, however, given that trends within the industry appear to favour larger contract orientated installers. But, demand depends on factors beyond the industry's control.

Distinctions between domestic and contract installers are not always as clear as this account would suggest. Cuts in Local Authority spending push installers back toward the domestic sector, contract work for gas and electricity boards crosses the divide, and companies which concentrate on domestic work in winter switch to contract work in the summer. Nonetheless, it is important to recognise differences between the sectors and to acknowledge the characteristically different factors which influence supply and demand in each context.

Although the cavity wall insulation industry is subject to a range of unique pressures and influences, many of the issues raised in this report are of more general relevance. For instance, small installing organisations have much in common with other small businesses and respondents' would have described similar constraints and pressures had they been fitting double glazing or selling vacuum cleaners. The same is true of manufacturers whose technical and marketing staff fulfil much the same functions as those employed in companies producing quite different commoditites.

It is the relationship between these organisational types which distinguishes cavity wall insulation from almost all other industries. There are few contexts in which such large multi-national organisations (the manufacturers) deal so directly with an installing population made up of such small businesses. The resulting tensions are likely to be as important for the industry's future as they have been for its past.