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## Quality Monitoring by Insurance Related Control

Contrôle de la qualité exigé par les compagnies d'assurance

Versicherungsbedingte Qualitäts-Überwachung

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### SUMMARY

The introduction of decennial insurance and technical control is discussed. The mechanics of control and its application to projects is examined. The relationship between control bureau, contractor and professional team is considered. The insurance cover is summarised and the factors affecting premium levels are set out. Reference is made to the Underwriter's need for technical control and its similarity to quality assurance activities applied to manufacturing processes. The standing of the control bureau vis a vis the contractor is explained and future developments are assessed.

### RÉSUMÉ

Une police d'assurance décennale et un contrôle technique ont été introduits. L'article présente le système de contrôle, son application à des projets, et les relations entre le bureau de contrôle, l'entrepreneur et l'ingénieur. La couverture d'assurance ainsi que les facteurs influençant le niveau des primes sont expliqués. Référence est faite aux besoins de l'assureur d'avoir un contrôle technique semblable aux activités d'assurance de la qualité dans les processus industriels. La position du bureau de contrôle est expliquée par rapport à l'entrepreneur et les développements futurs sont esquissés.

### ZUSAMMENFASSUNG

Die Einführung einer zehnjährigen Versicherungsdauer und technischer Kontrollen werden diskutiert und Kontrollmechanismen sowie deren praktische Anwendung untersucht. Die Beziehungen zwischen Kontrollbüro, Unternehmer und Planungsteam kommen zur Sprache wie auch die Versicherungsdeckung und die die Prämien beeinflussenden Faktoren. Es zeigen sich sowohl das Bedürfnis des Versicherers, technische Kontrollen durchzuführen, als auch deren Ähnlichkeiten zur Qualitätssicherung von Herstellungsprozessen. Die Stellung des Kontrollbüros dem Unternehmer gegenüber sowie die Entwicklungsmöglichkeiten werden diskutiert.



## 2. INTRODUCTION

In France in the 1920's the First World War was followed by a construction boom during which a number of expensive structural failures occurred. The government of the day ruled that all parties to a construction contract would be required to indemnify the building owner against structural and weatherproofing defects for 10 years and against defects in minor works for 2 years.

## 3. THE TECHNICAL CONTROL BUREAU

Architects, engineers and contractors then approached French insurers who agreed to underwrite the 10 year (decennial) risk provided that they received a favourable report from an independent control body. In this way the French technical control bureaux were set up.

## 4. RECENT DEVELOPMENTS IN UK

In England in the 1960's a number of judgements in actions following structural failures showed that parties with a "duty of care" were not adequately protected. One result has been the introduction by Government of the Housing and Building Control Act. Another has been a sharp growth of interest in decennial insurance against latent defects.

British property developers and building owners are beginning to insist on leasing agreements which require tenants to provide repairing and maintaining guarantees. It is now being realised that decennial insurance against latent defects is a convenient way for tenants to furnish the guarantees required.

In the period since 1978 there has been a gradual but steady increase in the number of decennial policies issued in Britain and since mid 1983 we have received appointments to provide a technical control service for some 50 projects. These have ranged in value of the works to be insured from £250,000 to £26,000,000.

## 5. THE MECHANICS OF TECHNICAL CONTROL

The Function of the Technical Control Bureau is to advise the insurer on the sufficiency of the structure to be insured.

The structural adequacy of a building is verified by a suite of computer programs written specially for this function. Compliance with British Standards and Codes of Practice is also checked. Architectural and structural detail drawings are examined as is the general practicability of the form of construction proposed.

On site the quality of material and workmanship is monitored by a team of experienced Chartered Engineers who also ensure that the works are constructed in accordance with the drawings. Detailed reports are made of each visit and at the completion of significant stages interim reports are sent to the underwriters.

These reports comment on progress, site management and housekeeping and are intended to reassure the underwriters that the works are being executed with the appropriate degree of care.

Quality monitoring of material is sometimes achieved by visits to manufacturers works and the witnessing of materials under test. During construction concrete cube test values are continually recorded and manufacturers test certificates are scrutinised.

Finally, and in time for the handover of the completed building to the owner, the control bureau will produce a report to the insurer confirming that the building represents a normal risk for decennial insurance.



Occasionally, in the early stages of a project we encounter hostility from the professional team but this usually evaporates in the common desire for the work to be executed correctly and to programme.

As the involvement of a control bureau in projects becomes more widespread it is to be hoped that reference to it will appear in contract documents. If architects and engineers know at design stage that a check on working drawings is to be carried out, closer co-operation to avoid unacceptable details should result.

## 6. DEFECTS

During structural design checks we have encountered significant mistakes in 10% of projects scrutinised and minor errors in 90%. These have ranged from elements which would have been severely overstressed in service to non compliance with the recommendations of the Codes of Practice on stability, weatherproofing and insulation.

Site inspections have revealed errors in the interpretation of drawings, cases of inadequate supervision leading to poor workmanship and untidy site storage with the risk of contaminating construction materials.

During our visits of inspection we take sufficient photographs to indicate the level of progress achieved and to record novel or unusual features. We also photograph defects and have found this to be the best way to have them corrected.

## 7. WORKMANSHIP GENERALLY

The development of computer controlled manufacturing processes results in the supply of consistently high quality building products delivered in good condition to construction sites. To incorporate these products into the building successfully requires the further ingredient of good site workmanship.

In these days of management contracts and specialist sub-contracts for all construction and installation activities advantage can be taken of the relationship between the management contractor and his sub-contractors. We have found that we can underline the importance of good site workmanship by formal meetings with the sub-contractors at which the main contractor and the professional team are also present. We then ask the sub-contractor, through the principal consultant, to talk us through the sequence of his activities and to describe the processes which he proposes to employ to ensure the quality of his workmanship.

We have also found that these meetings have an unexpected benefit in that they allow the sub-contractor to comment upon and to criticise details which may be unnecessary, or difficult to achieve. The presence of the control agency as a contractually disinterested party frequently results in a sensible workable compromise which has the agreement of all parties. This exercise is particularly useful when roofing sub-contractors are involved.

## 8. MAINTENANCE

The technical control function, properly applied and with the support of a good design and construction team, will result in a serviceable building being handed over at practical completion.

The continued serviceability of the structure will depend on a responsible programme of maintenance which is particularly critical in 2 areas.

8.1 External painting - which can frequently be made the subject of a leasing agreement.



- 8.2 Roof inspection - this requires an annual inspection of gutters, rainwater pipes and flat roof areas to ensure that all is well. A few hours spent each year can save serious damage which will result if roofs are neglected.

## 9. COMMUNICATION

In our experience it is important, in assessing the organisation of a project, to establish the effectiveness of the lines of communication within the professional team and within the Contractor's site management set up. We have found, on site, that our attendance at meetings ensures an immediate and effective link between ourselves and the Contractor and we have never had any trouble in getting agreement to reasonable requests for the rectification of sub-standard workmanship or materials.

The relationship between the professional team and ourselves is more complex and is influenced by the Consulting Engineer's understandable reluctance to admit to mistakes which might cost his client more money. In fairness however, it is necessary to consider two situations.

- 9.1 A design defect is discovered early enough to allow for it to be rectified before drawings are issued to the Contractor - in the resulting re-measurements the change is likely to go unnoticed.
- 9.2 We are not given drawings to check until the works are well advanced when although a defect might be acknowledged its rectification could well be an embarrassment to the Consulting Engineer. Our attitude in this situation is to try to think of ways to help in overcoming the problem as quickly and as cheaply as possible. Experience has taught us, however, that it is essential to follow up every agreement reached over the telephone with a confirmatory note.

Our conclusion is that Consultants and Contractors alike acknowledge that mistakes cannot be avoided and in general, they welcome timely criticism. Nobody likes last minute comment after the mistake has been incorporated into the works. One solution is to ensure that the technical control bureau is involved early enough to comment on working drawings before they are issued to the Contractor.

On site the preferred method is for direct confidential contact to be established between the Inspecting Engineer and the Contractor's Agent. The relationship developed between these two is vital to the quality of the works being executed.

At this early stage in the development of technical control for decennial insurance the Inspecting Engineer requires to be someone having considerable experience and tact. It is unlikely that a good Inspecting Engineer will be under 45.

If decennial insurance and technical control become the rule rather than the exception Contractors and Consultants will quickly learn what to expect from control bureaux. One day the equation may be generally accepted thus:-

Timely comment + reaction + discussion + rectification + inspection = quality

The thread which holds the equation together is communication.

## 10. UNDERWRITING THE RISK

Hitherto underwriters prepared to provide decennial insurance in Britain have been French based insurers with access to the statistics necessary to calculate the premiums. We understand that British insurance companies may be ready to enter the market. This would be entirely in character in an industry which started with marine risks underwriting at a coffee house in the City of London.



## 11. THE TYPICAL DECENNIAL INSURANCE POLICY

What follows has been summarised from insurance literature and is set out for general guidance only. As a civil engineer the author of this paper is not really qualified to discuss Insurance matters, but would be pleased to refer queries to the Underwriter.

## 12. THE COVER

The basic Policy covers physical damage to the premises caused by an inherent defect in the design, materials or construction of the structure. The Policy also pays for correcting the original defect. If there is no physical damage to the premises but nevertheless an inherent defect in the structure which threatens its stability and strength to the extent that remedial work is essential to prevent total or partial collapse during the period of insurance, the policy will cover the cost of this work.

Also insured is damage to the premises caused by subsidence, heave or slip of the land on which the building stands, provided that it causes damage to the structure. The policy covers this automatically; subsidence damage is not restricted to that arising from an inherent defect in the structure. Thus subsidence due to extraneous causes, such as adjacent building work, would be covered.

The basic policy may be extended to cover:-

12.1 Loss of rent, (usually subject to a one month excess and two year's rent).

12.2 It if becomes necessary to remove stock, machinery, plant, fittings or furniture whilst repair work is carried out following insured damage, substantial costs would be incurred.

These costs (including dismantling and re-erection at the insured premises) can be insured as a separate item. Provided the sum insured is adequate, cover will include temporary storage of goods removed.

12.3 When insured damage occurs it may be necessary to arrange for removal of debris from and dismantling or demolition or temporary shoring-up of the damaged part or even the entire building.

The cost of this work can be insured as a separate item.

12.4 Unless it results in damage to the Structure, faulty or inadequate weatherproofing is excluded from the policy.

However, the policy may be extended to include damage to the Premises caused by failure of the waterproofing envelope.

In addition, the cost of replacing defective waterproofing elements may be covered. This is subject to an allowance for depreciation but the additional impact of inflation can be offset by the policy indexation selected for the standard cover.

The waterproofing extension is subject to a 12 month deferment of cover from the date of Practical Completion. A further inspection of the waterproofing elements is carried out at that stage before the cover is finally confirmed.

The Insured bears 10% coinsurance of each and every claim under the extension, subject to a minimum contribution equivalent to the main policy excess operative at the time of the claim.





A separate sum insured is required for the extension.

The waterproofing cover has to be asked for at the outset, not during or at the end of the construction work, as additional Technical Control is required, and is available only as an extension to the basic policy cover.

The purpose of '10 Year Defects Guarantee Insurance' is to cover major damage, whether to structural or non-structural parts, which is why damage must be caused by a structural defect (apart from subsidence cover) and why the policy always carries an excess to eliminate minor problems.

In addition to loss of rent, it is very likely that vacation of all or even parts of the premises will incur further financial losses as a result of business interruption and these can be substantial. Annually renewable cover to run in parallel with the 10 Year Defects Insurance, for the occupier(s) can usually be arranged.

### 13. PROFESSIONAL INDEMNITY COVER

Decennial Insurance is not a form of replacement for Professional Indemnity insurance. Even on a Policy with subrogation rights waived the "professionals" are not absolved from potential liability.

### 14. EXCESS

The policy always carries an excess to eliminate minor problems which is normally a minimum of £5000. It is possible to increase this to any level and gain a reduction in the premium. The amount of excess is indexed in line with the inflationary allowance of the sum insured.

### 15. INDEXATION

Inflation over the years always tends to keep costs rising and this is particularly true of the construction industry. Because this is a '10 Year Policy', it is very important to make allowance for future costs. The policy is usually Indexed as a compound rate applied annually from the outset.

### 16. SUM INSURED

Either a 'Full Value' or a 'First Loss' sum insured may be chosen; a first loss sum insured may be indexed as well as full value. As the normal basis of claims settlement is full reinstatement a full value sum insured should represent the total estimated cost of re-building the premises, including adequate provision for related professional fees (e.g. architect's, engineer's, legal, etc.).

If a First Loss Sum Insured is chosen the insured is of course responsible for the residue.

As with most property damage insurances the 10 Year defects Policy is 'subject to average' which reduces the amount of a claim in proportion to any amount of under insurance.

Indexation should avoid the problem of under insurance. Furthermore, it is usually possible to top-up the sum insured during the period of insurance, if inflation rises faster than expected, subject to an appropriate additional premium.

An alternative is to arrange cover on a 'Deferred First Loss Sum Insured'. This is a combination of indexed full value and first loss sums insured, which allows for inflation overtaking the selected indexation level during the period of insurance. The normal indexed full value sum insured applies to the point at which inflation overtakes the Year 10 projected re-building cost. Once this



occurs, the Year 10 sum insured becomes a fixed first loss sum insured for the remainder of the period of insurance, the full value or 'declared re-building cost' as it then becomes, continues to be indexed at the percentage originally selected. This additional protection against the application of average incurs a reasonable additional premium.

#### 17. THE INSURED

This policy is assignable, which is a very important feature.

Frequently developers will not be using the premises themselves and the property will either be sold or let on completion.

Whoever effects the policy, whether for his own benefit or on behalf of someone else, is named in the policy and referred to as the 'Policyholder' until practical completion at earliest when cover commences in the name of the 'Insured'.

#### 18. INNOVATIVE DESIGN, MATERIALS OR CONSTRUCTION

Underwriters need to consider specially any innovative materials, design or method of construction which is untried, untested or unquantifiable.

#### 19. THE NEED FOR RISK ASSESSMENT (TECHNICAL CONTROL)

Underwriters have to be satisfied that the structure is designed and constructed to reasonable standards and is adequate for the proposed usage of the premises.

The purpose of risk assessment is to ensure that the basic risks covered by the policy - inherent structural defects causing damage or threat of collapse and subsidence are reduced to economically acceptable levels.

It is this reduction or control of the risk which is the primary function of Risk Assessment, in many ways similar to the surveys and inspections carried out in connection with other types of insurance (e.g. fire, theft, engineering).

However, most other insurances are on a annual renewable basis which enables regular resurveys to be carried out and terms revised, or even the policy cancelled, if necessary. This '10 Year defects Insurance' is a 'once and for all' non-cancellable commitment once cover has started.

The policy definition of the insured also includes 'any person who acquires the Freehold or Leasehold Interest in the premises during the period of insurance', so that any subsequent owner or tenant, as the case may be, can be insured.

#### 20. PREMIUM PAYMENT

There is a Single Fixed Premium for the entire 10 Year Period of Insurance. Additional premiums can be incurred for any amendments to the original basis of the Policy.

The premium is calculated at the outset by application of a rate per cent to the full value sum insured - or, in the case of first loss insurance, the Declared Rebuilding Cost. The same premium rate is normally applied also to the sums insured for removal costs, debris removal costs and fees. Loss of rent and water proofing covers are subject to different rating factors.

#### 21. PREMIUM RATING FACTORS

A number of technical factors affect the level of premium rate including :-





- a) The type of building and its intended use    b) Project location
- c) Design and type of construction    d) Foundations and soil conditions
- e) Amounts of excess and indexation    f) First loss or full value cover

The premium cost including control fees will normally fall within the range 1.00% to 2.00% for those contracts where the policy is effected at the start of construction. There is a minimum premium of £5000 including fees.

## 22. TECHNICAL CONTROL AND QUALITY ASSURANCE

The technical control process requires that a series of reports be sent to the Underwriter to inform him that significant stages of the works have been satisfactorily designed and constructed. These are :-

Report No. 1 - Initial Report (which gives a general description of the work, lists the parties to the contract and enables the insurer to indicate the level of premium which will be charged upon receipt of a favourable final control report).

Report No. 2 - Ground Conditions, Foundations and	)
Substructure	) issued at the
Report No. 3 - Main structure	) satisfactory
Report No. 4 - Cladding and Building Envelope	) completion of
Report No. 5 - Roof Support and Waterproofing	) each phase

Report No. 6 - Final report on Practical Completion and Finishes

Report No. 7 - 12 Month Post Construction Report (issued only if insurance cover has been requested for the roof waterproofing).

The issuing of these reports is a stage by stage endorsement of the quality of the works constructed. Technical control as a means of ensuring quality is therefore just as valid as the methods adopted by QA Inspectors during the various stages of manufacture of factory products. However the client (customer) of a construction project where insurance related control is applied has the further protection offered by the insurance policy.

## 23. THE CONTRACTOR

After some initial misgiving the Contractor usually comes to accept technical control as no worse than the intervention of Local Authority inspectors. The control bureau has no contractual standing and hence cannot issue instructions. It is usually enough to draw the contractor's attention, discreetly, to an item of poor workmanship or incorrect interpretation of a drawing to have the desired result.

## 24. FUTURE DEVELOPMENTS

The Housing and Building Control Act allows Local Authorities to arrange for certain categories of work to be privately certified as complying with the Building Regulations. The Act requires that such privately certified works shall be insured against latent defect for a period of 10 years, and that the person certifying the works shall be insured against negligence for 15 years.

Evidence of a willingness to underwrite a 15 year risk has not yet been found and Government may have to reduce this period before the market will respond.

It is felt however that after further development Britain will have a well established market for long-term insurance against latent defect. As a step towards effective quality assurance in the construction industry this must be welcomed.