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# THE ROLE OF THE ENGINEER IN THE FUTURE OF ENGINEERING INSURANCE

## SUBJECT MATTER

## CAN THE MODERN ENGINEERING UNDERWRITER AFFORD TO BE WITHOUT THE TECHNICAL ASSISTANCE AN ENGINEER CAN PROVIDE?

**PREPARED AND PRESENTED**
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**CONTENTS:**

# THE ROLE OF THE ENGINEER IN THE FUTURE OF ENGINEERING INSURANCE

## OBJECTIVE:

TO CONSIDER, QUANTIFY AND EVALUATE THE ROLE OF THE ENGINEER:

(1) IF, INDEED, THEIR INVOLVEMENT IS DEEMED A NECESSITY, IN THE FUTURE OF ENGINEERING INSURANCE AND, IF SO;

(2) THE EXTENT OF THE ENGINEERS' INVOLVEMENT AND THE ROLE THEY SHOULD ASSUME AND;

**(3)** IF THEIR ROLE SHOULD BE CONFINED TO ENGINEERING INSURANCE.

## ENGINEERING INSURANCE:

Reference to Engineering Insurance herein, embraces all categories of Risk eligible to be underwritten in Engineering Insurance Departments. These include: Construction (EAR & CAR) & Third Party Liability, Completed Civil & Structural Works, Boiler Explosion, Electronic Apparatus, Machinery Breakdown, Extraneous Damage, Works Damage, Plant All Risks (mobile & non-mobile ~ owned or hired-in), Business Interruption, Advance Profits, Deterioration of Stock and the like. Clearly, there are Technical Risks usually underwritten in other Departments, such as Professional Indemnity, Manufacturer's Guarantees, Explosion (both physical and chemical), Products Liability and the like, having technical connotations, that generally fall into the realms of Engineering Insurance. Accordingly, it will be appreciated that all Engineering Technical Disciplines are involved.

## HISTORY AND ORIGIN:

Engineering Insurance has its origins in the inspection and standards associations established during the latter part of the 19th century to serve the Cotton industry, who were major users of steam plants to run their Gins. One of these associations, The Manchester Steam Users Association, gave rise to the formation of the first of the specialist Engineering Insurance Companies, who specifically provided an Inspection Service linked to a Boiler and Steam Apparatus Insurance Policy. Specialist Engineers were employed to undertake the inspection and certification of the Steam Plant.

## DEVELOPMENT:

With the progression of time the scope of the plant and machinery eligible for inspection and, especially, insurance purposes expanded. Firstly to include Mechanical Power Plant, then Electrical apparatus and finally during the middle years of the 20th century to

embrace all manner of Process Machinery. Also, during the 20th century, Electronic Devices came into being, which opened up a whole new field of Engineering Insurance.

In the pre-1950's era, Engineering Insurers dabbled in Civil and Structural Works Construction Insurance, however without much enthusiasm. From the mid-1950's this class of Insurance became more sought after and gained momentum and has since become a major source of Engineering Premium Income. Concurrently with the development of Civil and Structural Construction Insurance, users/owners of such property saw a need to insure completed works against damage or failure, thus Completed Civil and Structural Works Insurance Covers evolved.

## DEFINITIONS:

To clarify nomenclature utilised in this Paper it is considered prudent to define some of the terminology used:

| | |
|---|---|
| UNDERWRITER: | A person skilled in matters pertaining to the Commercial aspects of Insurance, such as, Risk Profile Interpretation, Premium Computation, Policy Wording Drafting, Statistical Calculation of Premium Rates, Setting of Acceptance Criteria, Controlling Risk Accumulation and Managing Net Retention and Reinsurance Exposure. Such Persons could also be Engineers with Underwriting Skills. |
| PROPERTY UNDERWRITER: | As defined above, but being skilled in multi-risk Underwriting as opposed to the Specialist Single class Underwriter, often identified as an Assets Underwriter. His/Her knowledge of all Risk Classes incorporated into the Assets Policy package may not be paramount, however they usually have Specialist Underwriters in support. |
| COMMERCIAL SURVEYOR: | Also named Inspector, being the Business Developer. Persons sometimes qualified as Underwriters and possessing selling abilities and, able to survey risks obtaining the non-technical (Engineering) data pertaining to the risk to facilitate proper Risk Underwriting. An Engineer could also fulfil this role, subject to having been trained in obtaining the necessary Commercial Information for Underwriting purposes. |
| ENGINEER: | Usually a Professional Engineer with a University Degree or a Board of Trade Ticket (Diploma) or a Marine Chief Engineers Ticket. They should be experienced in Machine Design, Installation, Operation and Upkeep. Civil and Structural Engineers should have similar Qualifications and have Design and Construction Experience. |

The Engineering Disciplines envisaged embrace Chemical, Civil, Electrical, Electronic, Geotechnic, Hydraulic, Mechanical, Metallurgical, Marine, Mining and Structural Engineers.

## INTRODUCTION:

The Twentieth Century can be said to be the century of greatest technological advancement, where Man progressed from Ox-Wagon to Spacecraft, from Knitting–Needles to Automated Knitting-Mills and from Crude Front-Loading Weaponry to Space-Wars Technology. In the early days not much was known about the metallurgical properties of materials, especially strengths, ductility, friction resistance and brittleness. Equally so, whilst much basic knowledge of electricity had been gleaned, there was still much to be learned. Likewise, many of the mysteries of concrete, bricks and mortar had not yet been exposed. Plastics and similar materials only came to the fore after the 2nd World War. Although, the acquisition of knowledge commenced early in the century, the real technological explosion occurred in the second half of the century and more particularly in the last 3 to 4 decades.

With the passage of time and, more particularly as Design media have developed, risk factors have become far more acute and critical. This is especially so following the advancement of design technology into Computer based Design Models. As a result, the Designer can work to close tolerances in determining the criteria relative to safety factors.

## INSURANCE UNDERWRITING CONSIDERATIONS:

Can it be, that Specialist Engineering Underwriters have achieved a level of competence and sophistication in their technical knowledge and risk appreciation, that they no longer need to rely on Engineers to evaluate and appraise technical aspects of risks, in order for them to understand the exposures adequately and thus effectively underwrite the risk? Certain Property Underwriters seem to be of this opinion and, their adverse results reflect this attitude. However, the seasoned and experienced Specialist Engineering Underwriter knows this attitude to be an incredibly risky gamble and a recipe for disaster.

The momentum of technology advancement is progressing rapidly and moving into prototype developments with many untried and/or experimental features, all of which increase the risk factor and financial exposures many fold. These aspects, embrace the development of new materials (both metallic & non-metallic), critical path design criteria (as well as design concepts), bigger and faster machines, the sophistication of Electronic Apparatus, the development of new Civil & Structural Construction Techniques, the formulation of new Chemical Procedures and Formulae and the like. Should we, the Insurance Industry, be paying the “School Fees” of Research and Development for industrial development and advancement?

The above observations apply not only to Engineering Insurance, but stand good for other Property Classes and also Marine Covers.

## TECHNOLOGY DEVELOPMENT AND ADVANCEMENT:

The Twenty-First Century must be considered to be a continuation of the technology development era, where design, specification and process criteria will continue to be on the cutting-edge of technological advancement and development. In addition knowledge and understanding of the response and interaction of new chemicals, metals, other materials and techniques is in its infancy and will only become apparent with the passage of time. This will necessitate Technical expertise and know how being available to the Insurer to determine and evaluate Risk.

## COMPUTER DESIGN AND PROCESS CONTROL:

Considering design and process control as a Computer generated function one would, at first blush, consider this to be almost infallible, but, not so, the human factor (carelessness and/or lack of skill, knowledge and understanding) plays an important role. The efficacy of such design work is totally reliant on the selection of the correct design or control model, the introduction of appropriate variable factors and, of course, the adequacy of data available to the Design System. Such data should include Chemical components and their properties, Metallic and Non-Metallic material properties and their applications, Concrete styles/specifications and uses as well as role models applicable to the various applications and techniques.

## CONSTRUCTION, OPERATING AND MAINTENANCE PROCEDURES:

### a) CONSTRUCTION:

Irrespective of the Engineering Discipline applicable, there are basic and necessary procedures and techniques to be followed throughout the construction programme. In addition the work programme must be structured to avoid overcrowding and must be sequentially implemented Thereafter, in the case of Machinery and Chemical Processes, there are additional procedures/techniques and safety measures to be implemented and carried out during the testing and commissioning phase. Here we are referring to the activation of safety devices, chemical analysis, running-up procedures and operating conditions. Unfortunately, many Commissioning Engineers nullify safety devices, ignore chemical protocols and deviate from prescribed procedures and techniques in order to avoid numerous trips during the calibration and adjustment phase of testing. Accordingly, many losses occur as a result thereof where over-speed, over-voltage and earth fault trips, or chemical analysis etc., would have avoided damage. Accordingly, Site visits by Insurance Engineers at strategic times during Construction and Testing could ensure that Risk Factors are controlled and minimised.

### b) MAINTENANCE:

This section embraces the Defects Liability period following construction and General Maintenance thereafter. It also includes monitoring relative to Decennial Liability Insurance.

Many of the misfortunes that befall property after take-over following construction have their origins in misdemeanours during construction and/or the inadequacies of procedures implemented after the property has been taken into commercial service. Some of the more common deficiencies include:

a) incorrect and/or irregular blow-down procedures of Boilers;
b) lack-of and/or incorrect calibration and adjustment of control and safety devices;
c) irregular, if ever, testing of safety devices, such as, over-speed trips, over-voltage trips, over-load trips, pressure release valves, chemical reaction analysis/recording apparatus and the like;
d) postponing (sometimes indefinitely) of general inspections including non-destructive testing;
e) not adhering to Manufacturers' specification of lubrication and maintenance procedures;
f) crack, subsidence, leakage and expansion/contraction surveys of buildings, other structures and the like;
g) pipeline movement, seepage and cracking surveys;
h) lack of skill, carelessness and malevolence of operating and maintenance staff;
i) original design and specification deficiencies;
j) omission to re-appraise chemical procedures and techniques, especially in exothermic and endothermic Reactors, which are susceptible to overheating and cracking;
k) inspections and tests by Government Regulations.

Here too, the involvement of the Insurance Engineer could avoid, minimise or check such deficiencies.

## QUESTION (1) DOES THE ENGINEER HAVE A ROLE IN THE FUTURE?

Clearly, based on the foregoing, it will be gleaned that most, if not all, misfortunes besetting Engineering Insurance have their origins in Technical Deficiencies or Inefficiencies and Human Error or carelessness. The forefathers of Engineering Insurance recognised the potential problems and the need to have an adequately schooled staff to monitor the perceived deficiencies. Thus, they linked their Policy cover to an Inspection Service.

Since the role of the Engineer has gradually been relegated to the background and, in many cases, eliminated from the scene, Underwriting Margins have progressively been eroded to the point where most Insurers are operating on negative margins. In order for the Underwriter to be fully appraised of Risk Factors, it is necessary for competent

Technical Appraisal to be undertaken by a suitably qualified Engineer. Commercial Surveyors are normally not qualified to understand technical terminology and may interpret certain facts incorrectly, or may misinterpret a statement that indicates technical deficiencies.

***Accordingly, the unequivocal answer to this question is that Engineers have a very definite and decisive role in the future of Engineering Insurance.***

## QUESTION (2) WHAT SHOULD THAT ROLE EMBRACE?

Having established the need for the Engineer in the future, let us now examine what that role should be. Although, over a period of time, some Engineers will migrate to Underwriting, Claims Negotiating or Business Development, we do not see this as their primary function and the Commercial aspects should generally be left in the hands of those Commercial Staff specifically trained for this purpose. To give the Engineers' Role a title, we would suggest *RISK AND SUPPORT TECHNICAL SERVICES* as a relatively descriptive title. Refer also to the Definitions

## RISK AND SUPPORT TECHNICAL SERVICES:

The functions envisaged basically revolve around four activities:

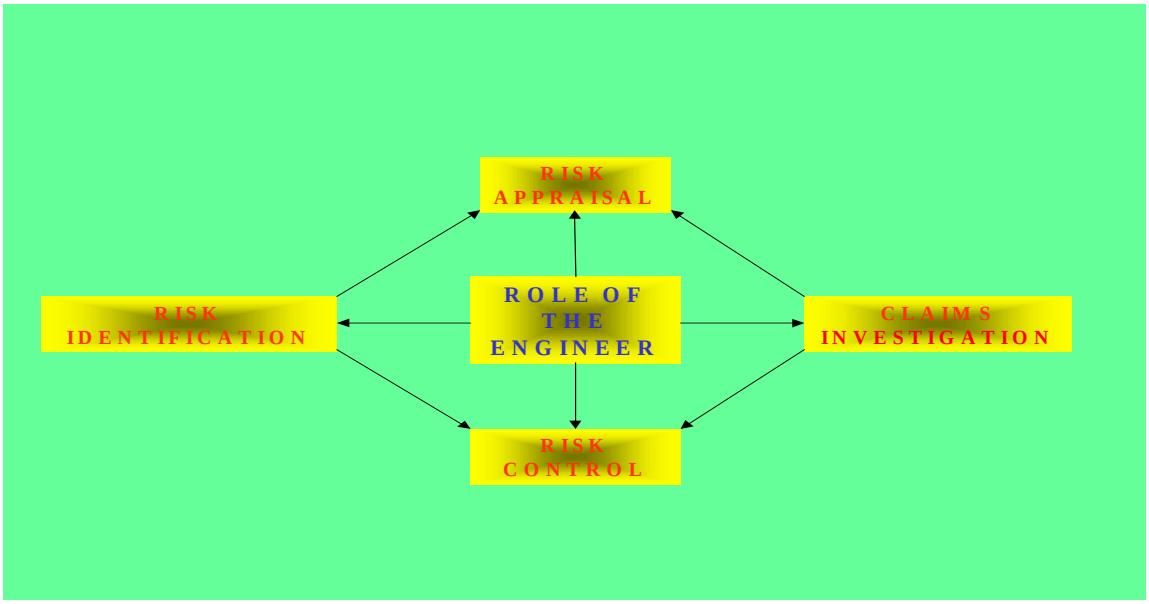


Figure 1

These four activities each divide into a number of sub-activities and sub-routines that complement one another. Fundamentally the role of the Engineer is integral with those of the Client's Loss Control Officer, Underwriter, Alternative Risk Financier and Risk Financing Advisor. It is a "partnership" venture, where each party has a decisive and

meaningful part to play and, derives equal benefit from the joint venture. The Engineer can be said to be the eyes and ears of the Underwriting Programme whose commitment to loss control may produce an incidental benefit to the Client's Loss Control Programme.

*It must be clearly established and understood that this Paper is not intended as an oratory on Risk Management.* Accordingly, the commentary on each of the activities will be brief and directed more specifically to the accumulation of Underwriting Information, through Risk Identification and Appraisal and identifying loss control factors.

At this point it would be as well to reiterate the importance and necessity of the Engineer, not only in the future of Engineering Insurance, but also to other Insurance Sections, such as Fire, Marine, Liability and Accident Departments. The Engineer must assume a role in forensic investigations into Fires, Chemical Explosion, Physical Explosion, Road and Rail Accidents, Shipping Disasters, Product Failures, Professional (Engineering) Liability and the like.

Let us now examine and discuss each of the activities shown in Figure 1:

RISK IDENTIFICATION – REFER FIGURE 2:

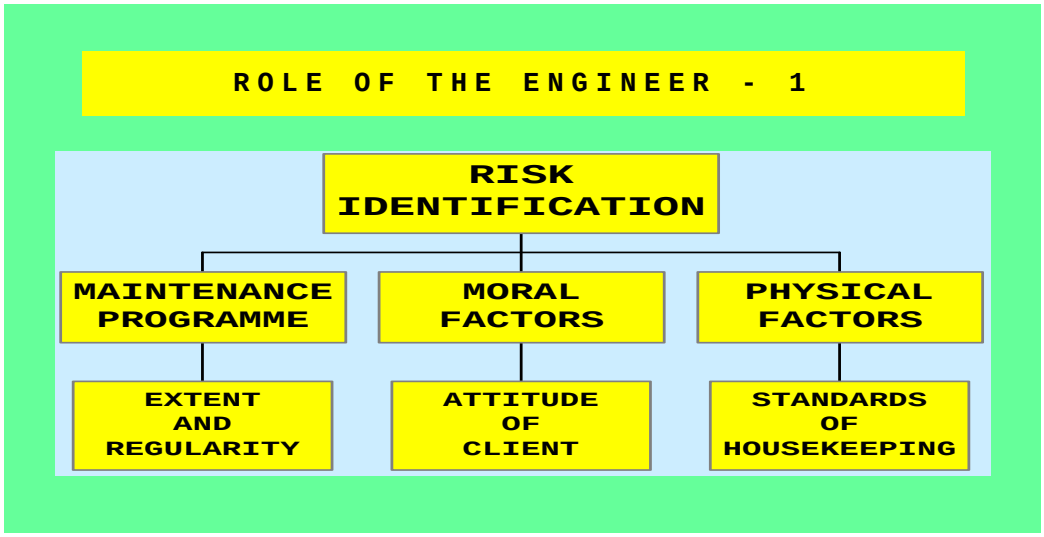


Figure 2

The core function of the Engineer is that of identifying Risk factors and to evaluate potential loss under the pertinent Insurance Policy. This function embraces three main activities, namely:

1) Maintenance Programme-
the identification of the nature and extent of Maintenance procedures, their regularity and the skills of the technicians undertaking the work. Clearly, the most prevalent factor in Machine breakdown is inadequacies in the Maintenance Programme. Many Machine Operators believe that a visual inspection and a lubrication service are all that a Machine needs on an Annual basis. They ignore the necessity of NDT, such as vibration analysis,

ultrasonic examination, eddy-current tests, magnetic particle or dye penetrant examinations, infrared evaluation of electrical apparatus and the like. Boilers are seldom given the consideration they deserve.

Similarly, in the case of Civil and Structural Property, the lack of proper Maintenance and Upkeep procedures are clearly identifiable and in a like manner could lead to premature decay, loss of integrity and structural failure.

Considering Chemical Installations, inappropriate or inadequate Maintenance Procedures could result in failure with disastrous consequences. Delayed or missed inspections may result in failure to identify corrosion or thinning of metallic vessels, piping or support structures. Failure under these conditions could result in Fire, Explosion or Vapour Cloud, all of which could destroy the Plant and other loss.

2) Moral Factors-
by appropriate inspection and questioning these signs that can be clearly observed and gleaned. For example, a Client who allocates excessive amounts of time to Production and grudgingly sets aside limited time for Maintenance and Servicing. Maintenance Programmes that are financially driven must be seen as a potentially high risk factor. On the other hand it is not difficult to establish a philosophy of running Machinery to destruction before taking it out of service. This attitude assumes that the Client will rely on Insurance Claims to cover Maintenance costs and production losses.

3) Physical Factors-
These are essentially sensory, especially visual, signs of lack of due care and control of the working environment to avoid damage. A clean, tidy and uncluttered working environment, not only denotes pride of possession, but, more importantly, a real culture of loss avoidance. Under this heading there are a number of factors to be considered, namely:
   a) adequately marked travelways for loads to be moved by crane;
   b) silica gel breathers being serviced correctly;
   c) the absence of oil under machines;
   d) regular removal of cuttings and shavings;
   e) machines being operated within design capacity;
   f) adequacy of lighting and ventilation;
   g) clean and clearly visible water level gauge glasses on Boiler installations;
   h) operating temperatures within acceptable parameters;
   i) machine oil levels at the correct capacity;
   j) sensed vibration;
   k) unusual sounds and noises;
   l) properly established and clearly marked Electrical Reticulation, especially Cable Trays and Racks;
   m) continuous and regular chemical analysis of procedures and products;

n) the absence of cracks or visible deterioration in civil and structural property and the application of protective coatings.

RISK APPRAISAL – REFER FIGURE 3:

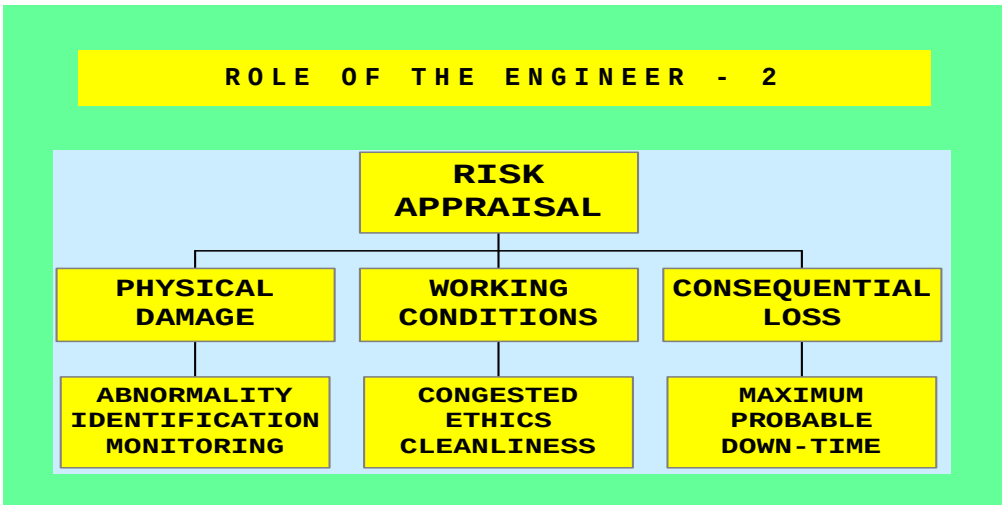

Figure 3

**Physical Damage-**
The Engineer should identify any abnormalities by visual inspection, reference to logbooks and questioning of responsible personnel. Where abnormalities are found, each must be considered as to their failure potential, the degree of risk involved and quantify the probable loss. These aspects would generally be beyond the capabilities of the Commercial Surveyor. Agreement must be reached with the client regarding a propagation monitoring procedure as well as the extent of permissible deterioration allowable before the machine, structure or service facility is taken out of service for repair. It may also be appropriate, at that point, to agree a maximum time factor until repair or replacement is undertaken, unless further deterioration occurs before the agreed date. It is also desirable at that point to agree the nature and extent of repairs necessary. In this way, appropriate plans can be set in motion to accumulate the necessary component parts and plan the repair procedure in order to execute same in the most effective manner and most economic time frame.

**Working Conditions-**
The working environment can have a positive or a negative effect on machine operation, civil and structural integrity or chemical process reliability and security. These conditions embrace physical and psychological factors, both of which influence the workers emotionally, either in a threatening or

satisfying manner. Accordingly, it is helpful for the Engineer to identify the prevailing attitude. These factors embrace:

Physical Factors:

a) whether any life-threatening conditions exist in the working environment;
b) congestion and/or overcrowding in the working area;
c) the presence of rubble or discarded packing materials in the working area;
d) the passage of loads being conveyed by cranes in or over the working area;
e) the general state of repair of the machinery and if this could be a threat to Workers;
f) the adequacy of lighting and ventilation;
g) qualifications, experience and training of Workers;
h) the presence of dust, noxious gasses or substances in the working environment;
i) potentially hazardous chemical procedures or handling.

Psychological Factors:

a) the safety record of the works relative to personal injuries or health hazards;
b) the commitment of Management to the implementation of Safety Regulations;
c) the attitude of Management towards Workers;
d) the attitude of Workers to Management;
e) the attitude of Workers to one another;
f) the positive or negative influence of Trade-Unions;
g) general discord amongst Workers regarding remuneration and/or Staff Benefits and/or Working Hours.

The factors outlined above as physical or psychological influences are very real characteristics of Risk Appraisal, as these generally determine the manner of use or abuse of machinery or other property.

**Consequential Loss-**

The evaluation of Risk under this heading embraces costs associated with restoring Physical Damage and losses due to Business Interruption. The objective being to accumulate losses from all sources. Refer to figure 4:

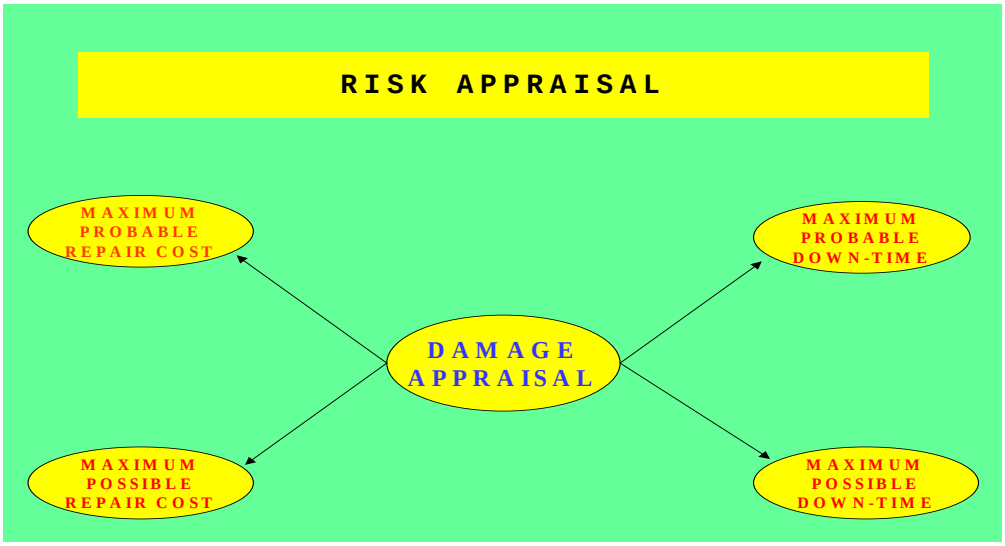

Figure 4

**Physical Damage:**
The Engineer's review of the Machinery or installation should encompass consideration of failure potential, recognising probable areas of weakness and limited life expectancy. Careful cognisance must be given to age, condition and working conditions of the machinery or other property or process in determining the *probable extent of damage* and thus the *probable repair costs*. It is also of interest to the Underwriter to be appraised of the Maximum Possible Repair Cost, which will assist in understanding the possible loss exposure.

In the case of Contract Works, other considerations need to be considered relative to the possible extent of loss or damage and the probable repair costs, namely:

**Civil and Structural Works:**
The potential for damage due to:
The Elements– Storm, Flood, Wind, Snow, Hail Frost;
Geotechnic Conditions– Subsidence, Collapse, Earthquake;
Hydrology Conditions- Underground Water, Rivers, lakes;
Oceanic Conditions- Wave Action, Tides, Currents;
The Construction Programme and Work Method.

**Electrical and Mechanical Works:**
Generally similar conditions apply as for Civil and Structural Works, in addition, inter Machine damage must be given specific consideration especially during lifting operations and during testing and commissioning.

**Business Interruption - Annual or Advance:**
Having identified the probable and possible extent of damage, these factors must then be converted to probable and possible repair periods. The repair period can be influenced by a large number of variables each of which must be fully investigated and reported upon. Some of the more important factors of influence are:

a) spares held by the Client;
b) the number of operating units to which the spares are available;
c) the manufacture of the machine, whether local or overseas and the lead time to obtain replacements;
d) if, the Manufacturer holds spares ready for shipment, or, if spares are only manufactured against orders;
e) the availability of technicians to install the spares;
f) where a component failure is likely to cause a write-off of the machine and possible inter-machine damage, the lead time in procuring a replacement unit(s);
g) other factors that may delay repairs or replacement, such as, annual shutdowns, public holidays, damage to foundations, loss of refractory linings, freezing or solidification of process materials and the like;
h) business cycles such as seasonal operations;
i) working times, days, weeks, months and shifts per day;
j) in the case of Advance Profits, adherence to the work programme and whether any change in this programme could mitigate any lost time

RISK CONTROL – REFER FIGURE 5:

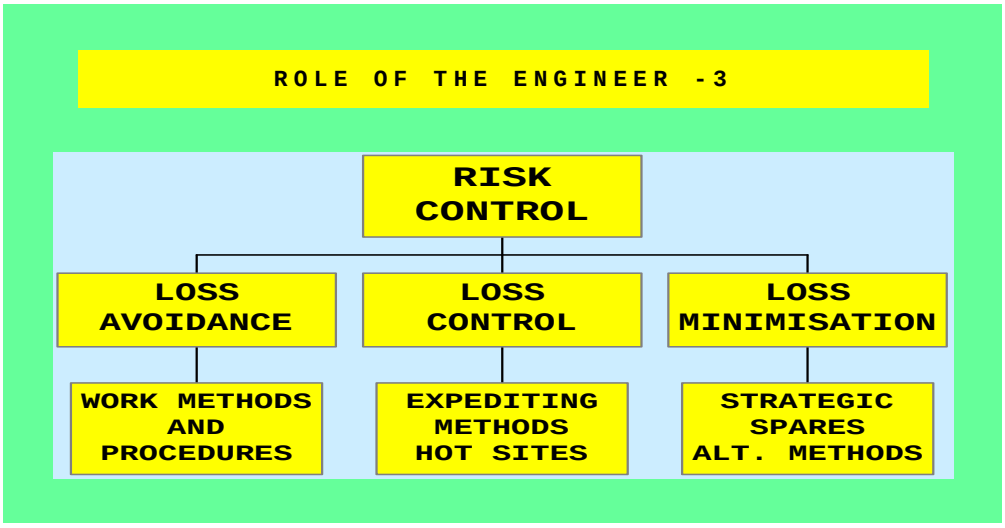


Figure 5:

These three sub-headings of Risk Control cannot, reasonably, be addressed separately, as they are so intertwined and dependent on one another that they need to be considered in parallel.

Loss Avoidance-is, of course, the 'first prize', accordingly, the Engineer's greatest efforts must be exerted in this direction. Loss avoidance presupposes that the potential origin of loss is first identified, then procedures and/or activities are implemented to help eliminate or minimise the possible effects thereof.

One must accept that machine damage is going to have its source in human error or machine deficiency, or in a combination of the two. To this end, the Engineer must identify the methods, procedures or deficiencies and thereafter devise and recommend methods, practices and/or procedures to avoid/eliminate the potential for damage, or at least, minimise the effects thereof.

In the case of Civil, Structural or Chemical Risks, human error is also a most likely cause of loss, however inappropriate procedures or design criteria are likely to play an equal role in cause of loss. Accordingly, the Engineer must pay specific attention to work methods and procedures to ensure their efficacy. As necessary he should agree alternative methods with the Client to eliminate or minimise the potential for loss.

Having identified the possible causes of loss and having recommended the implementation of necessary avoidance measures, the Engineer must then, in conjunction with the Client, investigate loss control and minimisation measures. These may fall into a variety of categories:

a) strategic spares, held either by the Machine Supplier or by the Client;
b) utilising existing machinery on a shift basis, or working overtime;
c) entering into a structured Preventative Maintenance Programme with a stated replacement policy;
d) Operator Training and Re-Training Programmes;
e) investigate 'Hot Sites' for production elsewhere;
f) structuring a plan to expedite the acquisition of spares and the installation thereof;
g) stockpiling of manufactured and partly manufactured products;
h) enter into bilateral agreements with competitors to utilise strategic stocks or spares to aid one another.

CLAIMS INVESTIGATION AND REINSTATEMENT - REFER FIGURE 6:

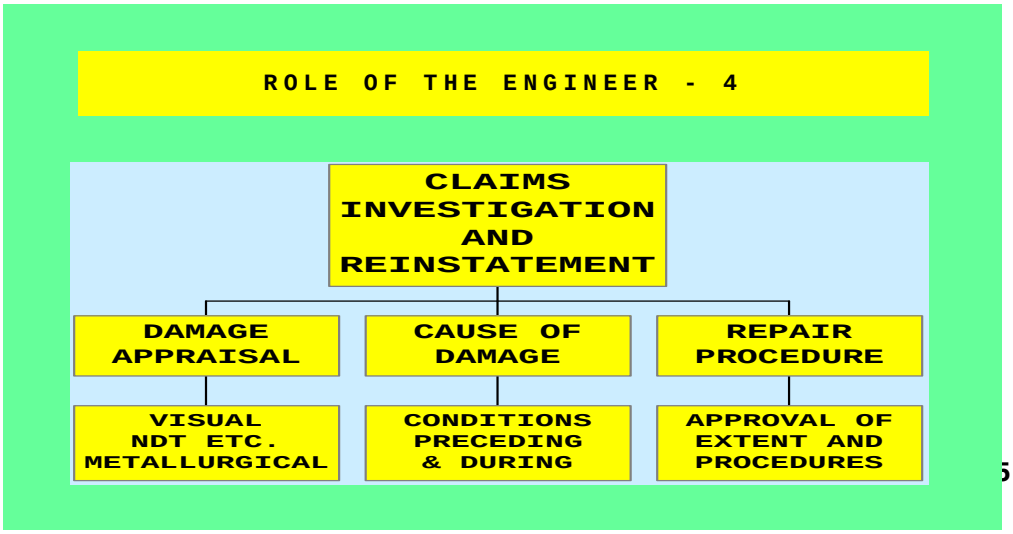

Figure 6

*The most appropriate person to investigate Claims and assist the Client in evaluating repair procedures and in minimising his Business Interruption is the Engineer who has worked with the Client in establishing the Loss Control Measures and Criteria. Accordingly, it is recommended that the Insurer's Engineer be appointed to process the Material Damage Claim and as necessary, an independent Loss Adjuster, to work in conjunction with him, in adjusting any Business Interruption Claim that may arise.*

Irrespective of the Engineering Discipline the Claim falls into, whether Electrical, Mechanical, Electronic, Civil Structural or Chemical, the failure mechanism investigation and repair procedure should be monitored and controlled by an Engineer, but ideally, there should be joint participation by the Insured's and Insurer's Engineers.

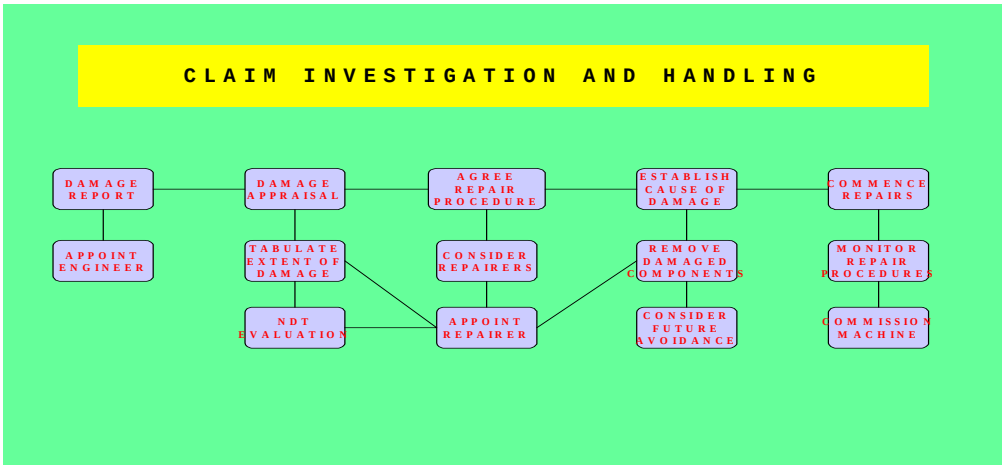


Figure 7

The role of the Engineer in the processing of Claims is varied, but the primary task is to identify the full extent of damage, not just that which is apparent, but, more particularly, concealed damage. This activity must be undertaken in conjunction with the Insured's Engineer and, where possible, the appointed Repairer. The investigation procedure should include Non Destructive Testing of apparently undamaged components. Such NDT would depend on the Engineering Discipline involved. In the case of damaged components, decisions would have to be made on the necessity or desirability of destructive testing to identify the failure mechanism.

Where the cause of damage is not apparent (as in the case of Storm, Subsidence, Fire etc), investigations must be instituted to establish the cause of failure, Once again, it is desirable for the Insured's Engineer and Repairer to be involved. This is an integral part of Risk Control and Loss Minimisation/Avoidance procedures. This activity may also determine the

nature and procedure of repair of damage. It may also suggest necessary modifications to avoid similar future damage.

During the repair procedure, it is imperative for the Engineers to monitor all activities thereof, to ensure that the work is undertaken to the appropriate criteria. It is also important, whether or not Business Interruption Cover is in force, that repairs be effected as expeditiously as possible, to avoid unnecessary disruption in the Insured's business activities.

Where Testing and Commissioning of Machinery is to be undertaken following the repair procedure, the Insurer's Engineer should be in attendance. Accordingly, there will then be at least two Engineers to monitor the run-up of the Machine and identify any deficiencies or calibration necessary to help ensure integrity of operation.

Clearly, from the foregoing, it will be seen that Claims Handling is as much a part Risk Identification, Appraisal and Control, as the original Risk Survey.

## CONCLUSION:

To be a successful Risk Carrier in Engineering Insurance, there is no doubt that the involvement of Engineers is imperative. Risk Identification, Risk Appraisal, Risk Control and Claims Investigation together with Repair Procedures falls squarely within the Job Description of the Insurer's Engineer and who must operate in conjunction with the Insured's Engineer. In this way a "PARTNERSHIP" is developed between Insured, Intermediary and Insurer. More importantly, the "partnership" develops sentiments of trust and confidence in each other's abilities and integrity and an understanding of the common objectives of the partnership.

There is little doubt that the Engineer is a Value Added Asset to the Insurance Industry, not only in their role as a member of the Engineering Department, but more specifically, because of the knowledge and experience they can disperse to all Underwriting Units relative to Risk Identification, Risk Appraisal, Risk Control and Minimisation.

Naturally, there is a cost involved in employing Engineers, whether as in-house Staff, or as Consultants, to which must be added travelling expenses, these costs can be recovered as a Service Fee, or, costed into Premium Charges. Either way, it is considered imperative that Engineers be involved in all aspects of Risk Appraisal, Control and Prevention as well as Claims Investigation pertaining to Engineering Insurance.

## THE FUTURE ROLE OF THE ENGINEER:

Based on the foregoing, it is the considered that the Engineer's Role will be far more involved in all activities of our business, not only as an integral part of the Engineering Insurance Team, but embracing all Insurance activities where technical know how would benefit Underwriting and Business Management.

The Engineer's Role would encompass:

a) Risk Services as outlined herein;

b) Direct Advice to Underwriters on:
   1) Risk profiles,
   2) Risk hazards requiring specific consideration,
   3) Risks needing to be excluded from or restricted in Cover,
   4) Conditions needing to be addressed before the granting of cover,
   5) The Probable and Possible Loss features applicable to Risk factors;

c) Identification and Appraisal of technological advances and developments in all spheres of Engineering;

d) Identification and Advice to Underwriters on deficiencies or weaknesses or abnormal hazards affecting particular Risks;

d) Participation in Risk Management Teams of Major Clients.

Many of the activities outlined above may not entail direct involvement and may well be actioned via the Electronic Media. Much information is available on the Internet or by communication with specific Web Sites. On the other hand communication with Clients is almost instantaneous by e-mail or by visual and audio communication through Net Meeting facilities. Accordingly, by using the Electronic Media to its full extent, we can always be in touch with our business and more particularly in touch with our Clients.