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MANAGEMENT OF CONSTRUCTION RISK THROUGH CONTRACTOR'S ALL RISK INSURANCE POLICY – A SOUTH AFRICA CASE STUDY

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Abstract: Contractors' All Risks (CAR) is a special insurance cover, which insurances those losses not covered by an 'excluded peril' in a construction contract. The benefit to the insured under this type of policy is that the burden is shifted to the insurer who, to resist the claim, is required to show that the cause of the loss falls within an exclusion. The objective of the current research is to study the effigency of CAR in mitigating construction risk and to determine the factors which affect the use of CAR insurance policy in South Africa. The data for the study were derived from both primary and secondary sources. The primary data was obtained through the survey method, while the secondary data was derived from the review of literature. The primary data for the study was collected through a structured questionnaire survey distributed to a sample of 67 contracting firms who had taken CAR insurance and are curently using CAR in mitigating construction risk and 6 insurance companys who insure contractors under this policy. Findings from the study revealed that CAR Effectively covers work in progress, CAR protects the contractor's interest effectively, CAR policy also protect the client's interests effectively and that CAR assist the contractor in risk management by recognising potential risks and reducing the probability of such risks. Whilst the factors which affect the use of CAR insurance policy in the South Africa construction industry include: stipulation of the adopted conditions of standard construction contract, client's requirement, cost and contractor's own interest. The study adds to the body of knowledge on the use of CAR in the management of construction risk in the South Africa construction industry.

1   INTRODUCTION

Risk is inherent in any business venture, much more to the construction industry. Vital organizational resources are invested in business opportunities in the hope of obtaining a favourable financial return (Liu, Li & Lin, 2007). Risk lies in the possibility that such a return might not be realized; hence, risk management is crucial in a project. The rapid growth of the construction sector in South Africa since the end of the apartheid era and with the hosting of the 2010 FIFA world cup, brought new challenges due to the risks involved in design and production. South Africa construction enterprises are experiencing significant developments and structural reforms. South Africa construction companies are mostly privately and publicly owned whose risks, losses and profits are undertaken by the individuals and the enterprise managing directors. The changing business environment in the South Africa construction industry requires all contractors to manage risks adequately thus protecting the client's from any form of loss.

According to Hertz and Thomas (1983), construction risk refers to a variety of situations involving many unknown, unexpected, frequently undesirable and often unpredictable factors. While, Perry and Hayes (1985) also referred to risk as an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective. Likewise, Jaffari (2001), asserted that risk is the exposure to loss, gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude, whilst Abbasi et al. (2005) considered risk by the possibility of loss, injury, disadvantage or destruction from a given task. On the other hand, Berk and Kartal (2012) described risk as the potential for unexpected consequences of an activity. Construction risk management is widely recognized as one of the most important procedures and capability areas in the field of project management according to Tadayon et al (2012). Because construction projects are unique and dynamic, the construction operation involves numerous uncertainties, multiple intricacies, varies techniques, and divergent environments with uncertainties. Hence, recognising and managing the potential risk factors, which can considerably differ from project to project depending on several conditions, plays a crucial role in enhancing the performance and accomplishing the successful delivery of the enterprise.

Construction risk management has been the subject of numerous research studies. One of the earliest attempts to study construction risks and systematically identify their sources can be credited to the work of Chapman and Cooper (1983), whose study presented the "risk engineering" approach, which incorporated different techniques and tools, such as PERT, decision trees, and probability distributions. Liu et al. (2003) inform that managing risk involves creating awareness of uncertainty, qualifying the risks, managing the controllable risks, and minimizing the impact of uncontrollable risks by risk allocation. The ineffective implementations of risk management are often caused by (Liu et al., 2007):

- a lack of formalized risk management procedures, including risk identification,
- analysis and control (Tah and Carr, 2001);
- a lack of continuity of risk management in the different stages in the project life
- cycle, including conceive, design, plan, allocate, execute, deliver, review and
- support;
- poor integration between risk management and other key processes, including
- design, estimating, planning, production, logistics, cost analysis, manufacturing,
- quality assurance, reliability, schedule analysis, support (e.g. maintainability),
- and test and evaluation; and
- a lack of interaction among different parties, including clients, contractors,
- Insurers, and suppliers.

Construction risk management mechanism and procedures are not new to the South Africa construction industry. One of the major methods of mitigating against construction risk in South Africa, include risk transfer. Transferring risk is normally through subcontracting, insurance and modifying contract conditions. Out of these, insurance is one of the commonly used risk transferring methods in the construction industry. Hence, the contractor's all risk insurance policy is a major risk mitigating tool in the South Africa construction industry. Hence, Odenyika (1999) observed that the insurance is one of the main methods of construction risk transfer in the construction industry. Also, Perera et al. (2008) scholar work also revealed that in the Sri Lankan construction industry risk is managed through insurance. Risk if, not managed properly, impacts negatively on the construction industry, hence the need to assess the efficiency of the generic solutions for risk management such as insurance. Therefore, the objective of this study is to assess the efficiency of CAR in mitigating construction risk and to determine the factors which affect the use of CAR insurance policy in the South Africa construction industry. The next section of the study discusses the subject matter of the research and thereafter, the methodology used for the study is presented before the presentation of the research findings, and thereafter, some conclusion and recommendation are made.

2   CONTRACTOR'S ALL RISK INSURANCE

Contractors' All Risks (CAR) insurance is an all-inclusive insurance cover used in construction contracts. CAR is a short term insurance policy, which insures "the works" in a construction contract. The first CAR policy is said to have been issued in 1929 to cover the construction of the Lambeth Bridge across the Thames in London. Further to that, a special policy was created in Germany in 1934, but the real development of the policy took place with economic recovery and the construction boom after the Second World War (Wassmer, 1998). In South Africa, the Contractors' All Risk policy is also often referred to as the 'Builder's risk' or the 'Course of construction policy'.

There are broadly two types of construction risks insurance. The first covers damage to property, such as damage to buildings and other structures being constructed or to the existing building in which the construction is being carried out (Dunning, 2009). The second type of CAR covers liability for third party claims for injury and death or damage to third party property. Modern forms of contractors' all risks policies in the South Africa construction industry covers both. CAR's basic principle is that the insurance covers those losses not covered by an "excluded peril". The Contractor's All Risks Insurance is specially designed to cover engineering projects involving both constructions of the building and other civil engineering works that are being carried out. CAR insurance provides coverage against any unforeseen and sudden physical loss or damage from any cause, other than those specifically excluded. Newman (2010) explains that the main characteristic of the CAR policy is that unlike other insurance policies, the CAR clause is not limited by reference to specified perils; in other words, everything is covered unless it is excluded, expressly or by implication. CAR policy is usually combined with (but must be distinguished from) Public liabilities or Third party liabilities policies in the South African setting. CAR is designed to provide cover for all the parties involved in a construction project, hence, the policy is usually acquired in the joint names of the Client or the Principal agent and the Contractor. Other interested parties, such as funders, often ask to be added as a joint name. According to Dunning (2009), the theory is that if damage occurs to the insured property then, regardless of fault, insurance funds will be available to allow for reinstatement. The effect of joint names insurance is that each party has its own rights under the policy and can therefore claim against the insurer. Each insured should comply with the duties of disclosure and notification. However, insurer has no right of subrogation against the other insured party, which means that the insurer is not able to recover sums paid to one co-insured under the policy by pursuing a subrogated action in the name of the other insured (Bunni, 1986; Flanagan & Norman, 1993; Dunning, 2009). The CAR insurance has a standard format regarding cover although different insurance companies may have different special wordings to suit their clients. Some significant features and benefits of the Policy include:

- Covers permanent and temporary works being carried out.
- Covers contractors' tools, plant, equipment (including spare parts), site huts and scaffolding.
- Covers cost of recovery of property that is immobilised or embedded in soft ground providing it is not due to mechanical or electrical failure of the property.
- Covers materials in transit to or from or, held in storage at contract site.
- Policy provides cover as standard in Great Britain. Republic of Ireland, Northern Ireland, Isle of
- Man, and the Channel Islands.
- Covers the cost of professional fees incurred during the reinstatement of property.
- Unlimited cover for the cost of debris removal.
- Cover applies during any maintenance periods specified in contract.
- Cover for the cost of rewriting plans and specifications (this is project specific).
- Provides cover (to a specified limit per employee) for the loss of employees' tools and effects.
- Contents cover (to a specified limit) for loss and damage to contents of show houses.
- Optional extension to cover continual hiring in fees.

The CAR insurance not only transfer risks, it is also assist the contractor in risk management by recognizing potential risks and assist in the reduction of the probability of such risks. Hence, Flanagan and Norman (1993) state that the readiness of the insurer to write an insurance coverage reflects favorably on the insured's efforts at risk prevention. According to McNamee, (1999) risk management

practice of the past largely focused on hazard insurance and probable loss. But today it focuses on the broad issues of general management. Among the insurance covers used in construction, Contractors' All Risk (CAR) policy has been accepted worldwide as a comprehensive cover by which all the material damages and third party damages are covered (Perera et al., 2008). The CAR policy used in South Africa is almost the same as that of other countries. The next section of the research discusses the methodology used in conducting the research.

3   METHODOLOGY

The data used in this study were derived from both primary and secondary sources. The primary data was obtained through the questionnaire survey method, while the secondary data was derived from the review of literature and archival records. The primary data was obtained through the use of a structured questionnaire aimed at 67 contractors, construction professional and insurance companies in Johannesburg to meet the research objectives. The construction professionals and contractors were randomly selected amongst their peers. Whilst the insurance companies that are known for undertaking CAR were surveyed. Survey participants included contractors, architects, quantity surveyors, civil engineers, construction and project managers who have experience in the use of CAR policy. A list of construction professional who works within the greater Johannesburg Metropolitan Municipality was obtained from the respective professional council and the Council for the Built Environment- the watchdog of professionals in the country via the various professional councils; whilst the list of contractors was obtained from the Construction Industry Development Board, the entity responsible for the registering of contractors in the country. This approach concurs with the work of Swan & Khalfan (2007) who advise that the inclusion of all construction professionals and contractors, is essential for successful project delivery- which applies to the current study. Random sampling was used to select the professionals and the contractors from the obtained list. According to Kombo and Tromp (2006) random sampling is the probability whereby people, place or things are randomly selected. From the list of construction professionals and contractors, 60 were randomly selected. This yardstick was considered vital for the survey in order to have a true assessment of the efficiency of CAR in mitigating construction risk and likewise to determine the factors which affect the use of CAR insurance policy in the South Africa construction industry.

Because all professionals as contained on the list had an equal chance to be drawn and participate in the survey. Out of the 60 questionnaires sent out, 51 were received back representing 85.0% response rate. This was considered satisfactory for the analysis based on the assertion by Moser and Kalton (1971), that the result of a survey could be considered as biased and of little value if the return rate was lower than 30% to 40%. Because the sample size for this study was relatively small, all groups of respondents were combined together in the analysis in order to obtain significant results. The data were analysed by calculating frequencies and the mean item score (MIS) of the rated factors. Although the empirical study is based on a relatively small sample of 51 construction professionals and contractors, the findings provide an insight into the general perception of the efficiency of CAR in mitigating construction risk and likewise the factors which affect the use of CAR insurance policy in the South Africa construction industry. The calculation of the MIS is explained in the next section. The research was conducted between the months of July to October, 2014. The questionnaire was designed based on the information gathered during the literature review and does not form part of an existing survey instrument.

3.1   Mean Item Score (MIS)

A five point Likert scale was used to determine the efficiency of CAR in mitigating construction risk and likewise the factors which affect the use of CAR insurance policy in the South Africa construction industry with regards to the identified factors from the extant review of literature. The adopted scale was as follows: (1) = Strongly disagree; (2) = Disagree; (3) = Neutral; (4) = Agree; and (5) = Strongly agree. The five-point Likert scale scores were transformed to an MIS for each of the identified factors as scored by the respondents. The indices were then used to determine the rank of each item. These rankings made it possible to cross compare the relative importance of the items as perceived by the respondents. The computation of the MIS was calculated from the total of all weighted responses and then relating it to the

total responses on a particular aspect. This was based on the principle that respondents' scores on all the selected criteria, considered together, are the empirically determined indices of relative importance. The index of MIS of a particular factor is the sum of the respondents' actual scores (on the 5-point scale) given by all the respondents' as a proportion of the sum of all maximum possible scores on the 5-point scale that all the respondents could give to that criterion. Weighting were assigned to each responses ranging from one to five for the responses of 'strongly disagree' to 'strongly agree'. This is expressed mathematically in Equation 1.0. The relative index for each item was calculated for each item as follows, after Lim and Alum (1995):

$$MIS = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{\sum N} \qquad \text{Equation 1.0}$$

Where; n1 = Number of respondents for strongly disagree; n2 = Number of respondents for disagree; n3 = Number of respondents for neutral; n4 = Number of respondents for agree; n5 = Number of respondents for strongly agree; N = Total number of respondents. Following the mathematical computations, the criteria were then ranked in descending order of their relative importance index (from the highest to the lowest). The next section of the article presents the findings of the survey and some discussion.

4   FINDINGS AND DISCUSSION

4.1   Efficiency of the CAR policy- The Insured's perspective

Based on the ranking (R) of the weighted averages, the mean item scores (MIS) for the listed perception of the efficiency of CAR in mitigating construction risk in the South Africa construction industry were identified (Table 1). The survey findings revealed the six list factors were all significant. The most important efficiency of the use of CAR in the industry were that: CAR policy protect the client's interests effectively (MIS=3.80; SD=0.71; R=1); CAR policy protect the contractor's interest effectively (MIS=3.71; SD=0.90; R=2); and that CAR assist the contractor in risk management by recognising potential risks and reducing the probability of such risks (MIS=3.68; SD=0.91; R=3) as shown in Table 1.

Table 1: Contractors and Professional perspective on the efficiency of CAR

USE OF CAR	RANK	MIS	SD
Contractor's all risk policy protect the client's interests effectively	1	3.80	0.74
Contractor's all risk policy protect the contractor's interest effectively	2	3.71	0.90
CAR assist the contractor in risk management by recognising potential risks and reducing the probability of such risks	3	3.68	0.91
CAR covers liability for the third parties	4	3.60	1.04
CAR effectively covers work in progress	5	3.46	1.04
CAR serves the procurement needs by covering material related risks	6	3.20	1.13

Whilst the two least rated usage of CAR as shown in Table 1 are that CAR effectively covers work in progress (MIS=3.46; SD=1.04; R=5) and that CAR serves the procurement needs by covering material related risks (MIS=3.20; SD=1.13; R=6).

4.2   Factor affecting the use of the CAR policy

Furthermore, when the perspective of the Insurer's was solicited on the factors which affect the efficiency of CAR, result emanating from the questionnaire analysis revealed that the most significant factors were

(Table 2): lack of background of construction (MIS=4.33; SD=0.78; R=1); lack of risk management knowledge and expertise in managing or administering CAR (MIS=4.25; SD=0.87; R=2); lack of understanding of contractor's/ construction risk (MIS=4.17; SD=1.11; R=3) and lack of risk assessment (extend to known) (MIS=4.08; SD=0.74; R=4).

Table 2: Factors affecting efficiency of CAR - insurer's perspective

Factors influencing the use of CAR	Rank	MIS	SD
Lack of background understanding of construction works	1	4.33	0.78
Lack of risk management knowledge and expertise in managing or administering CAR	2	4.25	0.87
Lack of understanding of contractor's/ construction risk	3	4.17	1.11
Lack of risk assessment (extend to known)	4	4.08	0.74
Construction projects are too vulnerable to loss.	5	3.33	1.07
Lack of qualification to undertake construction project risks	5	3.33	0.98
It is a one chance business since construction insurance is a once off policy with no renewal applicable like property which is issued every year.	7	3.08	1.16
Complex risks which are often inter-related	8	3.0	1.13
Too many insured parties, (client, principal, main contractor, third party although for the project only)	9	2.83	1.03
Difficulty for the insurer to design an insurance policy	10	2.45	1.03

The least rated factors related to: too many insured parties, (client, principal, main contractor, third party although for the project only) – (MIS=2.83; SD=1.03; R=9) and difficulty for the insurer to design an insurance policy (MIS=2.45; SD=1.03; R=10).

Table 3: Contractors / construction professional perspective of factors affecting the use of CAR policy

Factors influencing the use of CAR	Rank	MIS	SD
Client's requirement	1	4.07	0.96
Construction industry environment	2	4.00	0.88
Conditions of standard construction contract	3	3.87	0.92
Knowledge and experience	4	3.77	0.80
Government policy	5	3.57	1.18
Contractor's own interest	6	3.45	1.15
Cost	7	3.21	1.26

Also, when the factors which affect the use of the CAR policy was assessed from the contractors' and design professional perspectives, it was found that the following statements as shown in Table 3 were scored higher: client's requirement (MIS=4.07; SD=0.96; R=1); construction industry environment (MIS=4.00; SD=0.88; R=2); conditions of standard construction contract in use for the project (MIS=3.87; SD=0.92; R=3) and knowledge and experience of the contractors / professionals (MIS=3.77; SD=0.80; R=4). However, the findings further revealed that the contractor's own interest and cost were not factors that affect the usage of CAR in the construction industry.

Findings from the study concurs with the work of Perera et al. (2008) which was based on the Sri Lanka construction industry; which revealed that the client's requirement is the most significant motivation for the

use of the CAR policy as opposed to the contractor's own interest. Also, the contractor's own interest was rated low which may have a bearing to the fact that contractors are not paying attention to the two concepts as theorised Flanagan and Norman (1993) which informed that contractors should not have a mentality of "All Goes According to plan" but must consider "What happens IF" in order to trigger their personal interest in obtaining the CAR insurance. The findings for the study was further supported by Liu et al. (2007) who inform that Chinese contractors do not use insurance because of the high influence of the environment which the Chinese government has caused contractors not to have a realistic attitude towards risk.

5   CONCLUSION

The study investigated the efficiency of CAR in mitigating construction risk and likewise the factors which affect the use of CAR insurance policy in the South Africa construction. This study identified the efficiency of the use of CAR and likewise the factors which affects it usage in the industry. The most critical efficiency of CAR's were identified to be that CAR policy protect the client's interests effectively; CAR policy protect the contractor's interest effectively; and that CAR assist the contractor in risk management by recognising potential risks and reducing the probability of such risks. Furthermore, the study found that the insurer's factors which affect CAR's usage in the industry as: lack of background of construction; lack of risk management knowledge and expertise in managing or administering CAR; lack of understanding of contractor's/ construction risk and lack of risk assessment (extend to known). The study also identified the contractor's and design professionals' factors which affect the usage of CAR as: adherence to client's requirement; construction industry environment; conditions of standard construction contract in use for the project and knowledge and experience of the contractors / professionals. The study concludes that there are a number of usefulness in the use of the CAR insurance in mitigating against construction risk in the South Africa construction industry. These usage have the potentials to greatly reduce risk to all parties to the construction projects in South Africa; and when properly implemented, it will give the industry an advantage to meaningful enhance profitability, productivity, compatibility and delivery of construction jobs which will boost the South Africa national economic growth and strength and performance of the construction industry. Hence, it is therefore recommended in order to increase the efficiency of use of CAR insurance, insurance companies should investigate the site in order to assess the risk and before computing the premium. Also, the contractors need to maintain a good records of accidents throughout the project to enable me see the need to protect their own interest. Also, insurance companies and contractors should maintain a cordial relationship by means of active communication especially with underwriters, loss adjusters, which will assist in knowledge sharing that will be mutually exclusive in the formation of the policy and that contractors should implement maximum safety measures as a priority especially if it can be foreseen as a potential risk of damage.

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