

AN ALTERNATIVE MODEL OF MOTIVATION FOR STEEPLEJACKS WITHIN THE PETROCHEMICAL AND POWER GENERATION INDUSTRIES

T. J. Durnall¹ and D. Proverbs²

¹ *Jacobs UK Ltd, Hollinswood House, Stafford Court, Stafford Park 1, Telford, TF3 3DD, UK*

² *School of Engineering and the Built Environment, University of Wolverhampton, Wolverhampton, WV1 1SB, UK*

Steeplejacks within the Petrochemical and Power Generation industries must routinely expose themselves to significant hazards, work in inhospitable environments, and regularly work shift patterns well in excess of the European Working Time directive, while ensuring that key elements within the UK infrastructure remain operating. The casual observer may also consider the steeplejack with a stereotypical view of being a somewhat basic individual, with simple motivational needs and an unsophisticated member of today's construction workforce. As part of a programme of study to research the motivational factors of steeplejacks within the highlighted industries, the primary motivators and demotivators are ascertained through a series of exploratory interviews undertaken with steeplejacks. In addition, a measure of correlation is identified with other construction based motivational studies, with regards to ambiguities when applying Maslow's Hierarchy of Needs theory. In seeking to apply the findings of this research to an established motivational theory, as well as explore how Maslow related ambiguities could potentially be explained, a new model of motivation was defined; the Perception of Personal Success model. Within this model needs are considered elements through which an aspirational goal (termed 'success') is achieved by their satisfaction. The model expects variances in the volume and topical breadth of needs within an individual, and describes a motivational cycle where, as the perceived definition of 'success' changes topical focus, the number of needs that comprise that success varies, and therefore the degree of motivational effort to fulfil these needs will vary proportionately. The research also reviews this model to key points within established models of motivation, and identifies areas for further consideration and review.

Keywords: Maslow's hierarchy of needs, motivational theory, perception of personal success, steeplejack.

INTRODUCTION

The modern steeplejack within the Petrochemical and Power Generation industries is expected to routinely work 12-hour, 12 day shift cycles, at heights in excess of 100 m, in sites considered major hazard industries (HSE, 2004) where significant hazards exist such as possible exposure to hydrogen sulfide (H₂S) and legionella. In addition, the need to process natural resources in increasingly remote locations such as the Kazakh desert (KazMunaiGas, 2007) ensures that hazardous environmental conditions not traditionally found in the industry must now be accepted. It is reasonable to expect

¹ toby.durnall@jacobs.com

² D.Proverbs@wlv.ac.uk

that the above factors will strongly influence the sort of person that seeks to become and remain a successful steeplejack, and that the hazards are reflected in the manner in which the steeplejacks conduct themselves with each other and their management. This is frequently in contrast to current employment legislation (HSE, 2005) and may be deemed unacceptable by many, where issues are frequently resolved by the threat or application of physical intervention. Productive working relationships are created with a significant emphasis upon respect earned, predominantly based upon the portfolio of projects worked upon and the individuals response to potential danger; the more hazardous the project the greater amount of respect earned. However, loyalty between individuals and companies may be very limited. This study ascertains steeplejacks' motivators and de-motivators in relation to established motivational thought, and establishes a measure of correlation with other construction based motivational studies with regards to ambiguities when applying Maslow's Hierarchy of Needs theory (1954). Most importantly though, the study provides an insight into how these ambiguities can be explained, which leads further to the definition of a new model of motivation.

THE PRINCIPLES OF MOTIVATIONAL THEORY

It is important to recognise and acknowledge that there is no single accepted definition of motivation. Definitions may vary from a process governing choice made by persons among alternative forms of voluntary activity (Vroom, 1964), or as the search for a process of thinking and feeling that causes the individual to behave in a certain manner (Kolb, Rubin and McIntyre, 1979). More recent definitions would include the cognitive, decision-making process through which goal directed behaviour is initiated, energised, directed and maintained (Buchanan and Huczynski, 2004) or that of Mullins (2005), where motivation is seen as the driving force within the individual, fuelling attempts to achieve goals, to fulfil needs or expectations. Although definitions or concepts of motivation may seek to simplify and bring easier understanding to the topic, motivational research remains a complex area due to the difficulty in accurately and impartially conveying and assessing influencing factors, and the individuals' importance placed upon them, without tainting the results through our own equally individual perception of what stimulus is worthy of response.

Factors influencing motivation

Cole (1995) identified the major factors that influence the individuals' motivational levels at work, with a multi-faceted approach that not only establishes that 'core' motivators of pay and rewards and work environment are important to the motivated employee, but that a wide range of influences achieve a motivated workforce. Perhaps most difficultly due to privacy reasons and likely lack of managerial influence in the individuals social and domestic situation, the individuals' external environment away from the workplace must be assessed for motivational influence and addressed where possible. Leading on from this, the influence of factors such as personal goals and abilities/intelligence must be recognised and applied within the organisational culture where possible. Furthermore, Cole's model is based upon both intrinsic and extrinsic rewards for the individual (Cole, 2004); intrinsic rewards create satisfaction for the internal stimulus such as a sense of achievement and pride, while extrinsic rewards satisfy the more material related stimulus of the individual, such as job security and company car.

Theories of motivation

To establish a base for the research, six motivational theories were critically reviewed. When considering content focussed theories of motivation, those that identify the individuals needs, the strengths of these needs relative to each other, and the goals the individuals pursue to satisfy their needs (Mullins, 2005), three leading theories were considered; Hierarchy of Needs Theory (Maslow, 1954); Hygiene Factor Theory (Herzberg, 1959); and Theory X and Theory Y (McGregor, 1960).

In contrast, process theories of motivation are concerned more with how behaviour is initiated, directed and sustained (Mullins, 2005). Three theories critically reviewed were; Equity Theory (Adams, 1963); Expectancy Theory (Vroom, 1964); and Goal Theory (Locke, 1968).

Application of motivational theories within the construction industry

Due to an absence of research with steeplejack subject groups, previous studies researching motivation in construction operatives were reviewed.

The predominant findings of McKenzie and Harris (1974), Wilson (1979), Olomolaiye and Ogunlana (1988) and Kaming *et al.* (1998) were that Maslow's Hierarchy of Needs Theory (1954) is perhaps not wholly applicable to individuals within the construction industry. In contrast to Maslow's belief, their findings indicate that physiological, safety and belonging needs, those on the lower levels of the hierarchy, are more important than the esteem and self-actualisation needs at the higher level.

In considering the suitability of Herzberg's Hygiene theory (1959) and the subsequently identified KITA (kick in the ass) management techniques (Herzberg, 1968), Haseltine (1976) concluded that these techniques were not suitable for the construction industry; in the following year, Herzberg (1977) proposed alternative programmes for the potential motivational levels of the construction industry to be realised. Furthermore, Zakeri *et al.* (1997) identified that hygiene factors are actually perceived as a greater influence upon construction operatives' motivation than the 'traditional' factors, compounded by the low ranking of those factors deemed as motivators.

In applying McGregor's Theory X and Theory Y, Schrader's Motivation of Construction Craftsmen (Schrader, 1972) related the characteristics of Theory Y individuals to the upper levels within Maslow's hierarchy of needs. Further correlation was provided by Haseltine (1976), who also proposed a progressive Theory Y approach to construction management; only the lower levels of Maslow's hierarchy were satisfied by traditional management techniques such as good working conditions, good pay, fringe benefits and job security.

METHOD

A qualitative, standardised open-ended interview approach was adopted for this research, with an accompanying list of motivating and demotivating factors, based upon the factors used in other motivational studies, to be prioritised by the subject group. This subject group, varying in age and experience, had initially been anticipated as 20 individuals, although it was subsequently proportionally reduced to five members due to the time and resource constraints of the research project, and the geographical location of suitable projects. Analysis involved compiling and ranking the results of the listed factors, reviewing the exploratory interview transcripts to

assess support for the factor rankings, and identifying any correlation or anomalies between the subject group members. In addition, the questions of the standardised interviews were written such that a broader background to steeplejacks as a subject group may be ascertained.

RESULTS AND DISCUSSION

The top 6 motivational factors of the subject group are presented in Table 1. All subjects confirmed that financial reward was a significant factor in maintaining their commitment to the industry, all recognising that earning potential was substantial given the hourly rates generally found and the long hours involved; interestingly these were recognised as a desirable means to increase incomes, and not as a negative factor. In addition, all interviewees made positive references to the challenges that a steeplejack faces, and that they created a number of motivational factors for the interviewees, such as variety of work, the need for problem solving skills, being hands-on and the prestige of being a steeplejack; all individuals spoke with pride about being a steeplejack.

Table 1: Overall ranking of motivating and demotivating factors of the subject group

	Motivating Factors	Demotivating Factors
1st	Can provide good standard of living for self and family	Lack of respect from colleagues
2nd	Job security	Bad management
3rd	Overtime	Management promises not being kept without a good reason
4th	Pride in being a steeplejack	[Lack of] Recognition by managers
=5th	Good relations with colleagues	Inequality with other steeplejacks
=5th	Fair pay	Bad weather

When read in conjunction with the results of the motivational factors scoring, the demotivating factors in Table 1 not only correlate with issues identified by previous studies with regard to Maslow’s Hierarchy theory (1954), but could also be considered a 'typical' range of construction industry related factors from studies upon Herzberg’s Hygiene Theory (1959).

Discussion of results

It can be seen that the top three principle motivators of the research all seek to satisfy the physiological and safety needs of the individual. Progress of the individual through the remaining hierarchy is then less clear, as a factor applicable to the satisfaction of an esteem need is then most important, with continued lack of clarity as motivational satisfiers of Self-actualisation, further Esteem, and Belonging needs are ranked in an order that does not correlate to Maslow’s hierarchical progression.

Although the interviews identified some comments that appeared to identify Theory X and Y individuals, the nature of the interviews was such that these comments could be explored further, and were frequently contradicted in other related conversations. This reflects the comments of Cole (2004) that the polar extremes of both categories do not actually reflect modern employment.

When considering Herzberg's work a significant difference is apparent between it and the research findings; the top three motivational factors of the subject group are all related to monetary gain, yet Herzberg's theory asserts that money is only a remover of dissatisfaction, not a motivator.

With 'fair pay' and 'Inequality with other steeplejacks' both being ranked equal fifth in their respective categories, Adam's Equity Theory (1963) can be viewed as being of some relevance to the subject group. However, the remaining factor scoring does not demonstrate that the ratios with others exist; the factor scoring and accompanying commentary from the subjects indicates that motivational effort is expended through individual drivers, not any generated through perceived inequality within groups.

Possible lack of scope to significantly address perceived inequalities may also hinder the suitable application of Vroom's Expectancy Theory (1964) to the subject group; the individuals' perceived relationship between their effort, performance and rewards may only influence a relatively small number of potential outcomes. Realisation of this within the subject group may cause the expectations to be limited, and as such, the applicability of the expectancy theory.

Locke's Goal Theory (1968) offers a potentially suitable model for the subject group, with motivational effort expended in the pursuit of goal satisfaction for the individual. This does not address the frequently group-set objectives that a team of steeplejacks must complete though; there is strong emphasis within the scores and data discussion upon the desire and necessity of working as a cohesive team. Conflict may arise as empathy with organisational goals can be at odds with the individuals' goals; for example, the need to work longer hours to achieve project success against the goal to spend more time at home.

CONSIDERATION OF AN ALTERNATIVE MODEL OF MOTIVATION

The findings of this research and that of McKenzie and Harris (1974), Wilson (1979), Olomolaiye and Ogunlana (1988), and Kaming *et al.* (1998) indicates that the lower items of Maslow's Hierarchy of Needs (1954) are applicable to the subject group and other construction operatives, with no clear pattern for individual progression or aspiration through the higher levels of the hierarchy. This may be interpreted as being due to a subjects needs being less complex than those deemed higher; the recognition of basic human requirements at this level is something most individuals can relate to with others. The lack of understanding of higher needs however, may be due to the more personal nature of what constitutes an esteem or self actualisation need. Maslow's Hierarchy of Needs theory (1954) should however still be considered a sound starting point for an alternative model of motivation.

The Perception of Personal Success model of motivation

Within the subject group, the lack of clarity when assessing higher needs may be due to the individual having a smaller number of needs within each section of the hierarchy. This may mean that each need is less discernable from another, as each need may be broad enough to have aspects in common with the needs of adjoining categories. Simply put, for a subject with ten needs in each hierarchical band, it is reasonable to expect that the bottom two may be similar to the upper two of the hierarchical band below it; the fewer the needs in the band, the greater the likelihood of similarity.

To expand upon this variance in the volume of needs between individuals, the achievement of what a subject perceives as personal success (where ‘success’ is the fulfilment of all needs to which motivational effort is applied, at all levels of the hierarchy), may be achieved through a relatively small number of needs. The volume of needs will of course vary from individual to individual as their perceptions differ, as represented in Figure 1 by the increasing size of each need category. The cycle of motivational effort begins in the lower right corner, where needs are relatively fewer; the darker line represents the motivational effort (m) that has been expended and ‘success’ achieved through the satisfaction of all hierarchy needs.

The research ascertained that all the subjects aspire to personal success, which may be defined as working on larger, more complex projects; achieving a promotion to foreman; or spending more quality time with family. It should not however be considered that the realisation of success will only occur upon the fulfilment of all needs; in reality the variance of human behaviour and external influences is likely to see changes to ‘success’ perception (Figure 2, State B) start to occur prior to need fulfilment.

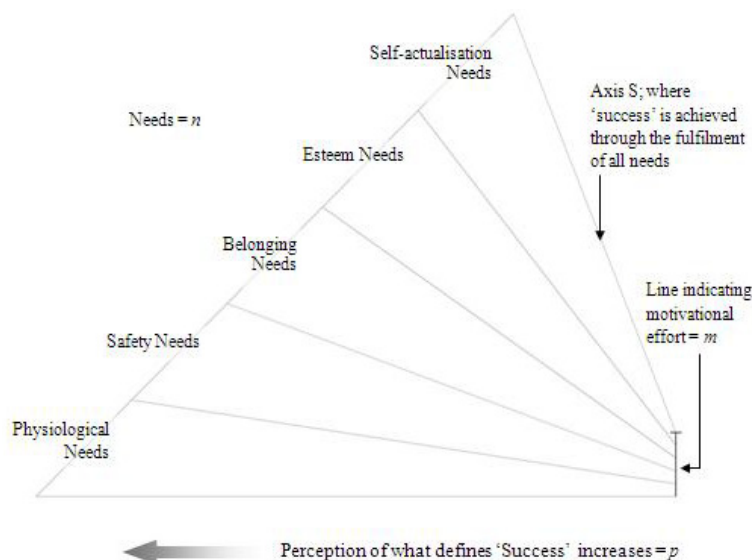


Figure 1: A model of the differing volume of needs for perceived ‘success’

This then forms a cycle where the increased level of aspiration requires a greater volume of needs to be satisfied (Figure 2, State C), through an increasing or sustaining of motivational effort, as represented by:

$m; (np)$ where motivational effort (m), is proportional to needs (n) multiplied by perception of success (p)

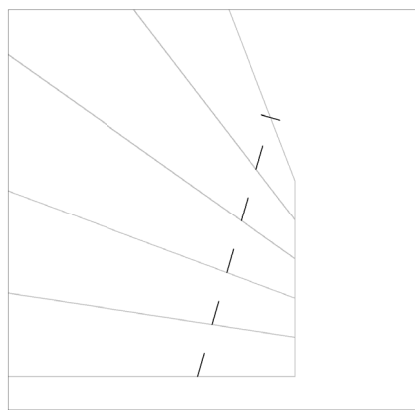
Reassessment of what is success may be a near continual process in some cases, particularly as it is reasonable to expect that numerous objectives may be present within the model at the same time. These objectives may even need to compete for motivational effort at times if conflict occurs, similar to Austin and Bobko’s (1985) observation of Locke’s Goal Theory (1968); for example the goals of a company versus the goal to spend more time at home.

Demotivation and dissatisfaction

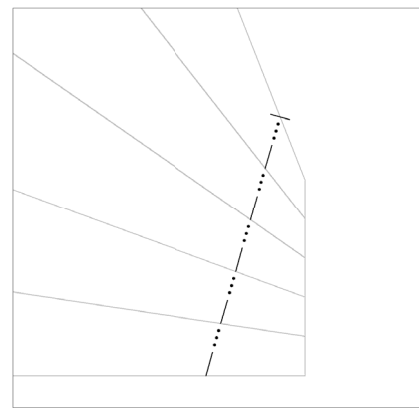
Within the model, demotivation is generated by dissatisfaction. Those opportunities for success deemed unattainable should not be factored by the individual into the

cycle of ‘perceived success attainment’ at too early a stage, to remove the likelihood of dissatisfaction occurring when the opportunities are not satisfied; for example an apprentice who expects to achieve Director status in the short to mid term will likely become dissatisfied sooner than a Project Manager with the same goal, for whom it is likely more readily achievable.

Further dissatisfaction is created within the individual if the cycle of their success attainment is hindered. In a work based scenario, if the individual believes that a number of needs have been achieved that equates to a measure of their perceived success, dissatisfaction and demotivation will occur if this success is not recognised by those individuals in a position to implement the perceived ‘reward’. This will subsequently decrease the volume of motivational effort applied to a topic. A subtle difference should be noted here, where the absence of opportunity in itself will not produce dissatisfaction (for example, the relatively small volume of work associated with the steeplejack industry), but the lack of any correlation between the subjects perception of success attained with their perception on an appropriate reward, will.



State B – When the perception of ‘success’ changes, but the same amount of motivational effort is applied, it is not enough to satisfy all needs (indicated by the voids in the line); ‘success’ is not achieved



State C – Motivational effort is subsequently increased (indicated by dotted portion of line) to fulfil the additional needs and thus realise the new perception of ‘success’

Figure 2: A change in perceived success and additional motivational effort

Review of Perception of Personal Success model to key motivational theories

The model seeks to address the key problems of Maslow’s Hierarchy of Needs (1954) as lack of clarity between needs is explained and allowed for, as a lesser volume of needs will mean they are less discernable from one another. When considering the commentary of Druker (1974) that Maslow does not account for the change in a motivational needs weighting, the Perception of Personal Success model sees this as a key element within the motivational cycle; it recognises that need weighting will change along with success perception. The continuum proposed by Alderfer (1972) has similarities to the cycle within the model, although it is expected that the granularity and diversity of an individual's needs will increase as their perception of success increases. In addition, Alderfer’s assertion of only three major individual needs may hinder managers and researchers understanding of the individuals' motivational needs and aspirations, by not readily enabling the suitable categorisation of needs as they increase in granularity and diversity. Finally, fulfilment of needs at different levels within the model is considered a by-product of the process of success re-evaluation, and not as a mechanism in itself of human motivation.

Agyris's (1964) commentary upon McGregor's Theory X and Theory Y (1960) recognises that the differences between individuals reflected the degree of maturity with which they were treated; this is recognised within the model as the degree of engagement and recognition that external influences, for example managers, give to the individuals' topics of motivational effort. Dissatisfaction, demotivation and apathy will occur if a manager only recognises organisational goals within the individual. Schein's (1988) motivational model goes some way to reduce the polarity within the Theory X and Theory Y model; however it does not readily lend itself to mapping the changing influence of needs, the topic, volume and transfer of motivational effort, and the changing nature of success as perceived by the individual. Perception of Personal Success model states that Schein's elements intertwine to model the motivation of the individual, and should not be considered as separate entities; rationale-economic, self-actualisation, and social needs are rarely immune from the influence of each other, as aside from the fact that similarities may exist, they must compete for motivational effort.

Adams Equity Theory (1963) and the Perception of Personal Success model share the principal similarity that it is reasonable to assume that an individual's perception of success may realistically be influenced by what is perceived as success for others. But it is critical to understand that in contrast to the Equity Theory (1963) it is not a perception of inequality that creates or sustains motivational effort within the Perception of Personal Success; the motivational topics that are active, and the conflict between them for motivational effort, may not allow for this to happen. For example, if a perceived inequality regarding salary existed with Adams theory, it is proposed that motivational effort would be applied by the individual to address this. Within the perception of success though, this may not occur as it could cause conflict with the other motivational topics holding greater motivational weighting, for example spending more time at home and learning to water-ski, and therefore the salary 'success' not be achieved. However upon reassessment of perceived success or the satisfaction of a topic of motivational effort, the weighting of the original topic may then increase thus receiving a greater degree of motivational effort.

Similarities also exist between the Perception of Personal Success model and Vroom's Expectancy Theory (1964), as both consider the individuals' subjective perception of their reality. There is however clear differences between the two that ensure they should be considered wholly separate, primarily the absence of any content based material in Vroom's theory, which is key to judging motivational effort with the Perception of Success. In addition, the Expectancy Theory does not address the mechanics and implications of simultaneous topics of motivational effort, and also sees the managers' perception of the individuals' definition and suitability for a role, combined with experience levels and skills, as influencing the individuals' performance. Within the Perception of Personal Success model, an external influence such as a manager will affect the performance of the individual through introducing dissatisfaction within the individual if topics of motivational effort are not recognised and acknowledged. In addition, the impact of external influences will be proportional to the weighting of the motivational topic to upon which influence is exerted; if a manager is negative towards the individuals work based motivational topic, yet that topic is the lowest weighted of all those receiving the motivational effort of the individual, the demotivating impact will be minimal, if any.

Locke's Goal Theory (1968) shares the similarity with the Perception of Personal Success model that goals are the drivers for motivational effort. However, the model

addresses Austin and Bobko's (1985) criticisms of the Goal Theory. In considering conflicting goals and their prioritisation, the presence and impact of conflict between motivational topics is clearly recognised within the Perception of Personal Success. Although quantity rather than quality based goals are considered as being rarely discussed, the does not discern between the two; it is the weighting of the motivational effort in relation to others that matters. Secondly, it was considered that goal setting cannot demonstrate its effectiveness outside of laboratory setting; the model was initially devised based upon this and previous construction based motivational research, and then considered further in the context of the principal motivational theories discussed here. Finally, the criticism that goal setting overlooks group goals is addressed in that the needs of the group are not considered significant within the Perception of Personal Success model. It is considered though that in scenarios such as group based goals and group based assessment, the specifics of the exercise are broken down into topics of motivational success and effort for the individual, as well as the actual process of being in a group becoming a topic of motivational effort.

CONCLUSION

The research has concluded that no one established model of motivation can be wholly applied to the subject group of steeplejacks. The Perception of Personal Success model should be considered an important addition to the motivational body of thought as it addresses a number of shortcomings identified in other models, but it is also a suitable model for the subject group in this research, as well as addressing the results of previous construction based studies and the lack of upper level clarity when assessing Maslow's Hierarchy of Needs (1954) as a model of motivation for construction operatives. By the application of this new model to the subject group, it can seek to explain how the range of needs can be fulfilled without requiring systematic progression through the hierarchy, and that higher level needs can exist but without discernable clarity.

Clearly, the Perception of Personal Success model requires testing upon a larger subject group. Additional research should also seek to establish more formal parameters whereby those needs and goals at a simpler level, where there may potentially be a degree of overlap with others, may be more discernable and therefore plotted more accurately within the model, though still retaining their focus upon a certain need. Furthermore, a manner of quantifying the movement of 'success' along the scale, and thus the measuring of needs, should be researched although the highly personal nature of an individuals needs may hinder the application of any quantifying to a subject group. In considering these recommendations, the model is being developed and tested further as part of an on-going doctoral study.

REFERENCES

- Adams, J.S. (1963) Toward and Understanding of Inequality. *Journal of Abnormal and Social Psychology*, **67**(4) 422-436.
- Alderfer, C.P. (1972) *Existence, Relatedness and Growth*. New York; London: Collier Macmillan.
- Argyris, C. (1964) *Integrating the Individual and the Organisation*. Chichester: John Wiley.
- Austin, J.T. and Bobko, P. (1985) Goal-setting Theory: Unexplored Areas and Future Research Needs. *Journal of Occupational Psychology*, **58**, 289-308.
- Buchanan, D. and Huczynski, A. (2004) *Organisational Behaviour: An Introductory Text*. 5th ed., Harlow: Pearson Education / FT Prentice Hall.

- Cole, G.A. (1995) *Organisational Behaviour*, Continuum
- Cole, G.A. (2004) *Management Theory and Practice*. 6th ed., London: Thomson.
- Drucker, P.F. (1974) *Management: Tasks, Responsibilities, Practices*. London: Heinemann.
- Haseltine, C.S. (1976) Motivation of Construction Workers. *Journal of the Construction Division, ASCE*, 102(3) 497-509.
- Health & Safety Executive (2004) *Health and Safety Commission Annual Report - major hazard industries*. London: HSE.
- Herzberg, F. (1959) *The Motivation to Work*. 2nd ed., New York: John Wiley & Sons.
- Herzberg, F. (1968) One More Time - How Do You Motivate Employees? *Harvard Business Review*, 46(1) 53-62.
- Herzberg, F. (1977) One More Time - How Do You Motivate Employees? A Retrospective Commentary. *Harvard Business Review*, Sept/Oct, 55, 523-534.
- Kaming, P.F., Olomolaiye, P.O., Holt, G.D. and Harris, F.C. (1998) What Motivates Construction Craftsmen in Developing Countries? A Case Study of Indonesia. *Building and Environment*, 33(2-3) 131-141.
- KazMunaiGas (2007) Kazakhstan Oil and Gas Sector [online].[cited 10th June 2009]. <http://www.kmgep.kz/eng/kazakhstan/kazakhstan_oil_and_gas_sector/>
- Kolb, D., Rubin, I. and McIntyre, J. (1979) *Organisational Psychology - An Experimental Approach*. 3rd ed., Upper Saddle River, New Jersey: Prentice-Hall.
- Locke, E.A. (1968) Towards a Theory of Task Motivation and Incentives. *Organisational Behaviour and Human Performance*, 3, 157-189.
- Maslow, A.H. (1954) *Motivation and Personality*. New York: Harper & Row.
- McGregor, D. (1960) *The Human Side of the Enterprise*, London: McGraw-Hill.
- McKenzie, K.I. and Harris, F. (1974) Money the Only Motivation. *Building Technology and Management*, May, 25-29.
- Mullins, L.J. (2005) *Management and Organisational Behaviour*. 7th ed., Harlow: Pearson Education / FT Prentice Hall.
- Olomolaiye, P.O. and Ogunlana, S.O. (1988) A Survey of Construction Operative Motivation on Selected Sites in Nigeria. *Building and Environment*, 23(3) 179-185.
- Schrader, C.R. (1972) Motivation of Construction Craftsmen. *Journal of the Construction Division, ASCE*, 98(2) 257-273.
- Schein, E.H. (1988) *Organisational Psychology*. 3rd ed., London: Prentice-Hall.
- Vroom, V. (1964) *Work and Motivation*, New York: Wiley.
- Wilson, A.J. (1979) *Need-important and Need-satisfaction for Construction Operatives*. MSc. Project Report, Loughborough University of Technology.
- Zakeri, M., Olomolaiye, P.O., Holt, G.D. and Harris, F.C. (1997) Factors Affecting the Motivation of Iranian Construction Operatives. *Building and Environment*, 32(2) 161-166.