

Soft system methodology in construction



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This document investigates Soft Systems Methodology, which is a way of dealing with problem situations in which there is a high social, political and human activity component.

SSM varies from other methodologies as it does not deal with the HARD problems that are more technically oriented but instead it deals with SOFT problems as will be discussed in detail later on in this report. SOFT SYSTEM METHODOLOGY: Soft System Methodology is the brainwave of Professor Peter Checkland. The methodology was devised as a result of “consultancy work” (Platt, 1995). Hutchings (2006) explains this development as an approach which can be accessed in the situation where Hard System Methodologies are fruitless. He writes, “When confronted with complex real world problems which cannot be defined solely in the scientific terms, Checkland was forced to abandon the classic system engineering thinking which could not describe fully the situation he faces. This led to a fundamental reappraisal of the classics “hard” approach and the subsequent development of the Soft Methodology”. Hence, SSM is classified as “a generic methodology” (Wilson, 1992) which should be adapted to any given situation.

It deals with “fuzzy” problem situations – situations where people are viewed not as passive objects, but as active subjects, where objectives are unclear or where multiple objectives may exist (Rosenhead, 1989). This is explained as human activity system (HAS) - a collection of activities, in which people are purposefully engaged, and the relationships between the activities (Platt, 1995). Hence SSM is a qualitative technique that can be used for applying System Thinking to non-systematic situations. It follows its

progression in seven stages as laid down by Checkland in seven stage model “ which is considered by most people to be the SSM” (Platt, 1995). The seven stages are incorporated into two parts: the real world and systems thinking, as illustrated in Figure 1. The diagram is divided into two halves. The upper half (Stages 1, 2, 5, 6, 7) are activities that take place in the ‘ real world’ “ that is they are based on the knowledge and experience of the participant of how things are to them” (Beckford 1998) and therefore should involve people in the problem situation.

The bottom half (Stages 3, 4, 4a, 4b) are ‘ systems thinking’ activities which are carried out in the language of systems and may or may not involve people in the problem situation, depending on the circumstances of study (Johnson, 1999). In Stage 1, the problem situation may arise with number of people feeling uncomfortable. Thus “ problem owners” (stakeholder of the problem) explore the situation more likely to say, “ unstructured the situation” with a view to make improvements (Reason, 2001). This problem situation is expressed in Stage 2, attempting to avoid the structuring of the situation that would close down the original thinking. In this stage SSM uses diagrams or models as a means of talking about a reality, rather than models of reality (Bennetts et al. , 2000: 192)Hence the situation is perceived through rich pictures. Rich pictures are the problem solvers own “ interpretive snapshot” of the “ mess” (Warning, 1996) not a system diagram.

They are the visual illustrations of people, issues, relationships; in that they capture all the rich, multidimensional issues that are part of a system. Rich pictures depict institutions, actors, linkages, and issues that matter to

stakeholders (Ramirez, 2002). In Stage 3 requires a complete shift of thinking to the consideration of “hypothetical or notional system” (Warning, 1996). Stage 3 develops a root definition of relevant system. It is concise description of a human activity system which states what the system is. A root definition is expressed as a transformation process that takes some entity as input and produces a new form of the entity as output i. e.

steel is transformed into a car (Khosrow, 2000). Rich pictures involve a variety of world views. Each root definition involves a transformation of one input to one output. The root definition is elaborated through its “checklist” (Platt, 1995) called CATWOE. Construction of the root definition therefore embraces Customer (C), Actors (A), Transformational Process (T), Worldview (W), Owner (O) and Environment (E) constraints. CATWOE analysis is illustrated in figure 3. In Stage 4 each root definition will result in a conceptual model. The conceptual model identifies the minimum necessary activities for that HAS.

In addition, it represents the relationships between the activities. The conceptual model must be derived from the root definition alone. It is an intellectual model and must not be clouded by knowledge of the “real” world. All of the elements of the CATWOE mnemonic must be included somewhere in the conceptual model; otherwise the conceptual model is incomplete (Platt, 1995). It should not be possible to take out words from the root definition without affecting the conceptual model. The actions are ordered systematically, drawing out the feedback loops (Reason, 2001). The conceptual models, which are the result of systematic thinking about the real world, are taken into the real world in Stage 5, where they are compared to

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the problem situation expressed in Stage 2. Here the conceptual model is also employed to surface possible change proposals (Reason, 2001) The conceptual model can be used formally or informally, methods adopted in the utility of the model depends upon the choice of its author, three purposed methods of using conceptual models are: reference and check – whether the activities in Stage 5 exist in Stage 2, imagine the conceptual model in operating in the real world and note all the practical implicating and template method – by overlaying the model from step 2 with the model from step 5, the matches and mismatches can be chalked out which can be tabulated for the ease of reference (Warning 1996).

In stage 6, the change proposals are thought through in two ways. First, the desirability of the human activity system captured in the system model is raised and discussed. Secondly, the issue of the feasibility is explored in the context of the problem situation, attitude and political interactions that dominate (Reason 2001). The change follows three norms: procedural changes (how activities are done within the structure), structural changes (organisational groupings, responsibility); or attitudes (changes of influence, learning, values and norms) (Beckford, 1998). In stage 7, action is taken – implementing in real-world situation the changes that have been purposed (Beckford, 1998). It is important to appreciate that once these changes have been implemented, the problem situation will be modified. In other words, the whole process follows cyclical pattern (Platt, 1995) [pic] FIGURE 1:

LEARNING CYCLE OF SSM TYPES OF RISKS IN CONSTRUCTION: Risk in the design: The design risk includes: • Errors in the drawing and design by the architects, structural engineer, Risk of finishing the drawing in the

agreed time, Risk due to number of revisions made in the drawings, Risk due to the mistake in estimation and costing, Risk occurs when a team member in the design team resigns which results in the delay in delivering the drawing.

Risk arising by the contractor: Risk occurring due to the in experience of the contractor in doing the kind of project, Risk occurring due to the lack of coordination with the sub contractors and the suppliers which results in delay of the work, Risk due to the manpower mismanagement and also due to the issues regarding claims, disputes, Risk due to the delay in payment of bill to the contractor by the client, Risk due to the hindrance happened due to the unpredictable climatic conditions, Risk in the delay of the project due to the use of low quality materials and equipments. Risk arising by the client:

- Risk due to not giving insufficient information on the clients needs to the contractor, Risk due to delay in making important decision, Risk due to the wrong selection of procurement route to construction of the building, Risk of delay due to changes in the architectural drawing and the design calculations, Risk due to giving less attention for the project. Risk

arising in the site: Risk due to improper soil investigation in the site which results in problems like water logging, Risk due to problem with the transportation facility to the site which delays in the delivery of the materials to the site, Risk due to the change in the site and other site conditions, Risk due to the hazardous substances present which results in project delay, Risk in delay of the project due to the climatic conditions. Other miscellaneous

risks: • Risk in delay of the project due to the delay in the approval from the local authorities, Risk due to some political interferences, Risk due to the

problems raised by the neighbourhood property owners, Risk due to the existence of previous building in the site. [pic] FIGURE 3: RISK IN

CONSTRUCTION MANAGEMENT
The Role of Each Stake Holder Involved: The stake holders involved in the Risk management study are: Risk Manager: He is the head of the risk management study. He initiates the meeting with the client and submits the risk management report to the client. The risk manager will prepare a risk management evaluation report to submit to the client.

Architect: Architect works on the design of the building based on the requirements given by the client. He is responsible for the design and he has to make sure that the design is proper and the risk of changes in the drawing is minimal. Structural Engineer: The structural Engineer proves the structural design of the project. He is responsible for the structural stability and the safety of the building. He can change the architect drawing if there is no structural feasibility in the design. Project Manager: The Project Manager is the main representative from the client side who is responsible for the whole construction work. He calculates the time limit to finish the project and also looks in to the quality considerations.

He coordinates the construction team and make sure that the potential of risk is minimum. Quantity Surveyor: The quantity Surveyor is a main part and works on the cost aspect of the project. He will be responsible for selecting and delivering different materials for the construction. The estimates proposed by the QS will be very competitive. Client: The client is the owner of the project. The client will be providing his requirements to the

project team. Therefore his satisfaction with each of the proposals is very important.

Service Engineer: The service engineer is responsible for the risk involved in the service provided in the building such as electrical, plumbing, air conditioning etc. The Information Client will need to provide to the Workshop

Participants before Each Study: The client provides the requirements he expects from the study to the stake Holders such as Architect, Structural Engineer and Quantity Surveyor etc. the information client has to provide are:

- The aim and the objective of the project.
- Quality

expectations: Quality is an important factor and has to be considered for the project. All the materials used for the project should be of high quality and proper checking has to be done by the project manager.

- Allocated

budget: The budget allotted for the project has to be clearly defined. This will help in calculating the cost control techniques.

The whole life cycle cost of the project and the cost certainties also has to be evaluated. Therefore a detailed risk management study has to be carried out during the pre defining stage.

- Time limit: The time limit to

complete the project has to be finalised and should be finished in the calculated time since it adversely affect the project budget. Therefore the time required for the design and the execution of the project has to be calculated.

- The list of machineries going to be installed in the

project. It is needed to fix the electrical connection.

- The risk manager should be provided with the plans of future expansion if there is any.

· The list of stake holders involved in the discussion. · Site
 Details: The site consideration such as the size and shape of the site and the area in which the site is situated has to meet the project objective. | Work Shop Agenda for Risk Management Study || | || ||| ||| ||| ||| |
 || ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| ||| Day 1 |||| Activity ||||
 Introduction to the day’s agenda. ||| 9. 00 AM | Analysis of the issues. || ||
 || 10. 00 AM |||| |||| 1.

00 PM |||| |||| 2. 00 PM |||| |||| 5. 0 PM |||| |||| |||| 6. 00 PM ||||
 | Study on risk analysis. |||| Identify important issues. |||| Time limit for project. |||| Brainstorm of strategic functions.

||| Lunch. |||| Client interacts with the risk management team and the consultants. |||| Complete construction of function diagram. |||| Review information of design, concept planning and contract documents. |||| ||||
 End of work shop. || | | Team review continued. || | 9.

00 AM | Review information of design, concept planning and contract documents. | | ||| Day 2 | ||| | 11. 30PM |||| | ||| | 1. 00 PM |||| | ||| |
 2. 0 PM |||| | |||| | |||| | 3. 00 PM |||| Day 2 | |||| | |||| | 4. 0 PM |||| | ||| | |||| 6.

00 PM ||||| Planning and collection of topics to discuss. ||||| Highlight functions for brain storming. ||||| ||||| Lunch ||||| ||||| Brainstorming and sort initial ideas. ||||| ||||| ||||| Select and group ideas for development. ||||
 | ||||| Presentation of the ideas developed to the clients. ||||| Specify the action plan. ||||| Make the action plan.

||| | Sum up and end. | 3. Hard and Soft Systems A broad classification of problem types can be derived by taking the extremes of the spectrum, which extends from 'hard' to 'soft' and by considering the destination between questions, which are concerned with 'how' an activity should be undertaken as opposed to 'what' the activity is. 'Hard' systems thinking is goal-directed as the particular study begins with the definition of the desirable goal to be achieved. It is essentially concerned with the question of 'how' to achieve a predetermined aim. 'Soft' is concerned with defining the options for improvement thus addressing the 'what to do' question. It is also committed to the examination of human activity, which is the other soft part of the equation.

The analogy by Brian Wilson (1990) considers two examples of problems, between hard and soft systems very clearly. The first problem concerns a flat tyre where the problem and the solution can be defined very clearly and easily. Here the solution will be recognised as such when the desired pressure is maintained in the tyre. This kind of easily defined problem represents one extreme of a problem spectrum, which extends to the kind of problem facing the British Government at the present time i. e. 'What should the UK government do about the Northern Ireland?' It is difficult to envisage a solution to that situation which will be recognised as a solution by all of the concerned parties. Wilson suggests that hard methodologies that may be suitable for solving 'burst tyre type problems' are inappropriate for organisational problem situations.

It is not only a question of techniques and tools, but also concepts and languages. Another difference between hard and soft systems thinking is <https://assignbuster.com/soft-system-methodology-in-construction/>

that in hard systems thinking a goal is assumed. The overall purpose of the methods used by the analyst is to modify the system in some way so that this goal is achieved in the most efficient manner. Whereas hard systems thinking is concerned with the ' how ' of the problem, in soft systems thinking, the objectives of the systems are assumed to be more complex than a simple goal that can be achieved and measured. Every system can be said to have a set of purposes or missions rather than goals. Understanding of soft systems can be achieved through debate with the actors in the systems. Emphasis is placed on the ' what' as well as the ' how' of the system.

Conclusion: It is more likely to say that the use of SSM is workable in the condition where the basic understanding of the situation is required. It provides information and hence this information can be utilized and incorporated with the other mythologies to make the system work in an esteemed faction. The proposal regarding the key issues are submitted to the client. The risk management study is expected to have a big impact on improving the success