

## MANAGING COMMUNICATION FOR MULTI-PROJECTS IN BUILDING CONSTRUCTION INDUSTRY

**Aminatuzuhariah Megat Abdullah**

Faculty of Built Environment  
University Teknologi Malaysia  
81310 Skudai, Johor.  
E-mail: b-zuhariah@utm.my

### **ABSTRACT**

*The role of effective communication in any project management organisation is extremely important. Recognised as a key element in the Project Management Board of Knowledge, project communications management provides the critical links between and among people, ideas, and information that are vital for project success. Good communications are also vital to the success of the project and to effective control of cost, time and quality. The importance of this element is also reflected in Multi Project Management, where many authors such as Owen et.al. (1996) and McHugh (1998) agree that without a proper communication plan, the flow of information between Multi Project Management (MPM) teams would be inhibited. This is particularly true when MPM teams are dispersed across different locations, which can frequently lead to misunderstandings.*

*This paper highlights some of best practices that need to be considered in managing good communication plan for such projects. They are such as some practices in Developing a Multi-Project programme and an Integrated Management Information System.*

**Keywords:** *Multi-projects Management, Communication Plan, Best Practices, Integrated Management Information System.*

### **1.0 BRIEF DESCRIPTION OF RESEARCH**

This research was conducted with the main aim of establishing best practices in managing multi-projects (M-Ps) in construction. Besides a comprehensive literature review, the Commonwealth Games M-P (CG M-P) in Manchester has been taken as a major case study for this research to provide an insight into the approach taken by the management teams. Based on these investigations, a list of best practices was then established and empirically tested amongst construction practitioners in the United Kingdom. Suggestions for best practices in MPM for the construction industry have been described elsewhere (see Abdullah and Vickridge, 1999). This paper only highlights some best practices for managing communication for M-Ps. Lessons learnt from the CG M-P are also highlighted to support the discussion. The interviewee's names and their companies (marked\*) are coded to maintain confidentiality.

## 2.0 THE DIFFERENCE BETWEEN PROJECT MANAGEMENT AND MULTI PROJECT MANAGEMENT (MPM)

Based on the author's research on MPM for construction industry in the UK, there are vast differences between project management and MPM. According to Turner (1992), traditional project management has concentrated on scoping, planning, management and control of a single project. It aims to deliver well-defined tangibles or deliverables within specified parameters of cost, time and quality. However, in the M-P environment, while each project will retain its own scope and goals, all teams should be tuned into the overall "M-P goal". This M-P goal is what the M-P manager, and the M-P teams strive to achieve, being given a specific time and set of anticipated benefits. Many authors (such as Olford, 1994; Eskerod, 1996 and CCTA, 1994) agree that managing M-Ps is different to managing a single project. Based on the literature review, the differences are summarised in the Table 1.0.

Table 1.0 : Differences between a single project and M-P

| Project Management (PM)   | Multi-project Management (MPM)   |
|---|--|
| Has a dedicated project team headed by a project manager with the responsibility and authority to get it done.                        | Often sharing resources: with team members working on many projects over a short time.   |
| Has less stakeholders, thus there shall be less conflict in terms of views and it is easier to achieve conclusion in decision making. | Has many stakeholders and each has different objectives. Thus, it is difficult to agree on certain decisions.  |
| Deals only with one type of project.  | Has various types of project which have different sets of objectives and criteria.   |
| Less resources needed in terms of materials, finance and human resources. Thus it is easier to plan and control the project.          | Large number of resources needed, thus its levels of complexity, conflict of interests and risks are much higher than managing single projects. The management style and structure are also more complex.      |
| Has definite start and end dates.   | Projects continuously being added to the mix of projects and the end date of the current workload is extended  |
| Has a clear objective   | Has unclear objectives and may not be consistent across all projects.  |
| Has a well-defined scope.   | MPM means the constant addition of new projects possibly resulting in major changes in scope and priorities.   |
| Has an intense and focused activity that is 'driven' by the projects that are to be delivered.  | MPM is a broadly spread activity that uses a process approach and is concerned with more broadly defined objectives.   |
| Has definite change control mechanisms but is best suited to objectives that are closely bounded and relatively certain.              | MPM is suited to orchestrating large numbers of component projects and activities with complex and changing inter-relationships, in an uncertain environment (that is, a larger and more dynamic environment). |
| Project Management is suited to deliver a project or product.   | MPM is suited to managing the impact of and the benefits from a number of component projects and ensuring that there is a smooth transition into a new business operations .                                   |
| PM is a discipline to direct and manage a project, which focuses on a tactical issue  | MPM is the integration, prioritisation, communication and continuous control of multiple projects, which focus more on a strategic issue and to achieve broad M-P objectives.                                  |

## 2.1 Problems in Managing M-Ps

The emergence of a new alternative approach to managing M-Ps is due to many problems associated in managing them. The problems highlighted by various authors that make communication and co-ordination of tasks amongst the MPM team difficult are as follows:

- i. Difficulty in establishing M-P goals and objectives due to the involvement of many stakeholders in the M-P environment (Eskerod, 1996) and inconsistency of the objectives across all projects (Olford, 1994);
- ii. Complexity in managing M-Ps due to the differences in size, skill mix, and urgency of M-Ps (Payne, 1995). Due to the dynamic nature of M-Ps, it may be very difficult to get an overview of the project pool, to keep an eye on each project, (Eskerod, 1996) and to prioritise between the projects (Knutson, 1994);
- iii. Difficulty in allocating and assigning resources due to the complexity of the projects (Eskerod, 1996). Unanticipated resource conflicts cause delays and cost more to meet completion dates (Olford, 1994);
- iv. Changes in project scope and priorities due to constant addition of new projects (Knutson, 1994). For example, according to Olford, the addition of a large project into the human resource workload may cause major disruption, necessitate re-planning and affect one's focus;

## 3.0 BEST PRACTICES FOR MANAGING COMMUNICATION FOR M-PS

### 3.1 Communication Plan

The role of effective communication in any project management organisation is extremely important. Recognised as a key element in the PMBOK, project communications management provides the critical links between and among people, ideas, and information that are vital for project success (PMI, 1994). Good communications are also vital to the success of the project and to effective control of cost, time and quality (Eager, 1997).

The importance of this element is also reflected in MPM, where many authors such as Owen et.al. (1996) and McHugh (1998) agree that without a proper communication plan, the flow of information between MPM teams would be inhibited. This is particularly true when MPM teams are dispersed across different locations, which can frequently lead to misunderstandings (McHugh, 1998).

According to CCTA (1994), a communications plan should be set up as early as possible in the M-P definition phase and adequately maintained throughout the M-P. Amongst the objectives of the communication plan are to (CCTA, 1994):

- Raise awareness of the benefits and impact of the business blueprint;
- Keep all staff in the target business areas informed of progress prior to, during and after implementation;
- Gain commitment from staff in the target business area to the changes being introduced;

In response to all the problems stated in 2.1, many authors share a similar opinion based on their experiences in managing M-Ps. These best practices have been tested empirically with 12 building and construction consultants, that are implementing MPM in the United Kingdom.

### 3.2 Establish Sound M-P Goals and Strategies, M-P Brief and Business Case

Before the communication plan can be established, the M-P goals and strategies, M-P brief and business case need to be established. The discussions below are in response to problems (i) and (ii) described in section 2.1.

In one organisation, there might be several mix-types of projects that share resources. many authors (such as ccta, 1994; jacob, 1999, abdullah, 2000) emphasise the importance of selecting the appropriate project mix for the portfolio. for example, ccta (1994) states that candidate projects should meet one of these criteria, i.e.:

- Projects should have shared objectives;
- Projects should have shared resources that can be optimised by co-ordination across projects;
- There should be strong interdependencies between projects having closely related technical interfaces;
- Projects should be compatible with infrastructure plans.

Abdullah (2000) and Jacob (1999) state that in order to understand which projects are to be selected, it is important to quantify the present projects and understand the resources allocated to them. Jacob (1999) also suggests that projects may be classified by size and strategic direction, or by financial impact.

Once the preferred set of M-Ps has been selected, M-P goals and strategies should be developed. Many authors such as CCTA (1994), Sommer (1998), and Fu et.al., (2006) suggest that the objectives of the establishment of the M-P's goals and strategies is to measure M-P proposals against corporate objectives as well as other projects within the organisation.

Sound M-P goals and strategies will ensure efficient delivery of a M-P throughout its life cycle (for example, Pellegrenelli, 1997 and Howard, 1998). Pellegrenelli (1997) suggests that goal-oriented M-Ps provide a means of dealing effectively with situations where uncertainty prevails and learning is a prerequisite to making progress. Clear M-P goals and strategies also motivate M-P teams to work more efficiently in delivering M-P (Kalmes & Lewis, 1998; Fu et.al., 2006).

#### 3.2.1 M-P Brief and Business Case

Similar to the management of a single project, in MPM, the importance of the M-P brief and business case is also emphasised by CCTA (1994 & 1996) and Abdullah (2000). The M-P business case should be established with the objective of measuring costs and benefits resulting from investment into the M-P (CCTA, 1994). These are very closely associated with the strategic objectives and the production of end deliverables. According to Strange (1995) and Fu et.al., 2006), the M-P business case may well form part of the contractual issues but are most certainly clearly defined in the scoping document or terms of reference for the M-P. The M-P business case provides the boundaries in which the M-P may operate and carefully defines the scope of the M-P in order to facilitate change control (Fu et.al., 2006).

Besides meeting the needs of the business (Hayden, 1998; Lauying et.al., 2007) M-P goals and strategies must also satisfy the key stakeholders' objectives, needs and requirements (Daw, 1999; Lauying et.al., 2007). To understand the key stakeholders' objectives, needs and requirements, Handy & Chandhuri (1998) suggest that a substantial time must be allowed during the preliminary stage of the M-P together with a co-ordination of efforts with various stakeholders (Daw, 1999). This is supported by Abdullah (2000) who finds out that if users, sponsors and team members can all see how their decisions and interactions interrelate, everyone would have a better understanding of how their decisions and behaviours impact overall performance and how they can help ensure overall success.



### 3.2.2 Lessons Learnt from the CG M-P

The author's investigation on the C-G M-Ps reveals that the Manchester City Council (MCC) as a client for C-G M-Ps, has initiated many other M-Ps such as Millennium Projects, Great Northern Initiatives, Conference Centre and Multiplex Cinema. The M-Ps shared the same objectives i.e. to satisfy regeneration strategies for the Greater Manchester.

As a representative for the local government, MCC is committed to ensuring that the CG facilities comply with the Regeneration Strategies. These strategies were established in 1994 through partnerships with various private bodies. The core regeneration strategies for Manchester are as follows: (Abdullah, 2000)

- To increase the population of the City;
- To attract or develop more multi-national companies;
- To increase employment for local populations;
- To provide full access to all sections of the community to the services and facilities that the City offers;
- To reclaim and develop derelict land and buildings to European regional capitals standards; and
- To provide a quality environment and sustainable development within the city, for the long term benefits of residents, and enable local people and future generations to enjoy an enhanced quality of life economically, environmentally and socially.

### 3.2.3 Creating Good Working Environment in the MPM

Many authors also believe that good leadership leads to the establishment of a cultural environment for the M-P which is one of "Truth, Trust and Teamwork". With good working environment shall lead to good flow of information. The operating principles for MPM are:

*Organise an integrated team with clear responsibility, authority and accountability.* According to Flemming & Koppelman, (1996); Dirik (1999) and Hans et.al., (2007), roles and responsibilities should be delegated, in order to provide a clear scope of work that needs to be carried out by each member of the MPM team. Flemming & Koppelman, (1996) also suggest that functional management should be prepared to empower their chosen representatives in the project teams, by providing them with sufficient authority to act independently of the functional departments they represent.

*The Integration of information.* To ensure the integration of information, decisions, plans and tasks, Laufer et.al. (1996) and Gray (1997) suggest the integration of all the participating organisations and people in the projects. This can be done by using the responsibility matrix, with the goal of identifying participants and their roles (Jacob, 1999). The responsibilities matrix is also useful for the M-P manager, as it highlights who is working for which managers and can indicate any other commitment they might have (Woodhouse, 2000).

*Build trust within each team* - Laufer et.al. (1996), Daw (1999) and Odum et.al. (1998) also highlight the importance of developing the mutual trust among key members of the high performance team helps to avoid the withholding of information between members. Based on their experience, Odum et.al. (1998), state that once the trust has been developed, the MPM team would operate with integrity and mutual respect.

*Carrying out teamwork building sessions regularly.* To ensure the success of the MPM organisation, many authors also recommend the importance of carrying out teamwork building sessions regularly with all the players to establish and improve teamwork and relationships. A series of workshops for example, should both identify the challenge and give the group a common language and focus (Odum, et.al., 1998; Ledet & Maroulis, 1998). Fleming and Koppelman (1996)

also believe that with good teamwork, the required time to build buildings or engineering work, could be reduced, and maximum product quality can be incorporated into the technical design the first time through. Hence, overall reduction in total project costs can be achieved (Flemming & Koppelman, 1996).

### 3.2.3.1 Lessons Learnt from the CG M-P

The roles and responsibilities of the M-P manager were found to be consistent with findings from the literature. However, unlike MPM within one organisation, the interviewees emphasise that the success of M-Ps for construction is not the sole jurisdiction of the M-P manager. Other MPM teams such as cost consultants, master plan designers, project designers and specialists, all play an important role in decision making in the MPM process. For example, the cost manager is responsible for preparing a cost plan for each project within the M-P, following receipt of outline design proposals. Projects to be monitored by the cost manager need to be reviewed regularly in conjunction with the relevant consultants. The cost manager is then responsible, in conjunction with the M-P manager, for providing the synopsis of these cost plans and for determining the overall capital cost estimate, which then becomes the basis of cost control procedures for the whole M-P.

One unique characteristic of the CG M-P is the existence of several different stakeholders in the M-P. Each of them have different objectives and requirements. The VM approach has addressed this important issue and has recommended various VM workshops attended by all the stakeholders to prioritise the objectives and requirements of the project/s. This approach has been adopted by MCC, where its design teams and all of the stakeholders met frequently, to study various guidelines established by Commonwealth Games for England, English Sports Council and the Manchester City Council business strategies. The operational sustainability of the M-P is considered to be the main priority, together with meeting the cost, quality and stakeholders' satisfaction. Many negotiations have been made to ensure that the design satisfies all the stakeholders' requirements. Viability and feasibility of the projects, such as their initial capital costs, future operational and maintenance costs, and project revenues, were all studied thoroughly with the help of various specialists (Abdullah, 2000).

### 3.3 M-P Planning and Resources Management

Good M-P Planning and resources management shall lead to good communication in the MPM process (Abdullah, 2000; Hans et.al., 2007). In response to problem (iii) "Difficulty in allocating and assigning resources due to the complexity of the projects"; as stated in section 2.1, many authors believe that the adoption of best practices described below helps to mitigate the problems. As being recognized by many authors, M-P planning and resources management M-P Planning and Resources Management is at the heart of the MPM process. It starts with the identification of the portfolio of projects in the M-P and continues with a description of the M-P scope of work, the milestones, the schedule and the overall budget. It has been well recognised that in a M-P environment, resources are being shared across this portfolio of projects, and hence, balancing resources within a single organisation is of prime importance in the MPM approach (Daw, 1999; Hanh and Ruppel, 2008).

Since a M-P consists of many projects of different sizes, types, complexities, and in some cases is dynamic (i.e. having constant additions of new projects as described in section 2.4), projects have to be prioritised to establish their sequence of implementation (for example Combe & Githens, 1999), and to prioritise resources utilisation (Cagno et.al., 1998; Hanh and Ruppel, 2008).

### 3.3.1 Understanding M-P Complexity

Baccarini, (1996) who studies complexities problems in projects, suggests that in planning complex projects, this complexity problem can be alleviated by interpreting and measuring in terms of differentiation and interdependencies of project needs and activities in the M-P. According to him, projects can be analysed in order to ascertain whether there is a correlation between the level of project complexity and the degree of integration.

His opinion is shared by many authors (such as Laufer et.al. 1996; Anderson, 1999; Hanh and Ruppel, 2008). For example, Laufer et.al. (1996) claims that the problems of complexity can be alleviated, to some extent, by integrating project plans where there are common elements, such as shared resources and common reporting systems and accounts. This is done at the strategies level, where a milestone plan and project responsibility chart (Anderson (1999), would be developed for all projects. This is derived from an estimate of timescales, costs and resourcing needs for each project, which is obtained from project team members (Hanh and Ruppel, 2008).

### 3.3.2 Systematic and Integrated Planning

Many authors also suggest that using a systematic and integrated planning approach can also minimise the complexity of the M-P. According to Laufer et.al. (1996), systematic planning is a multi-phase process that starts with setting the objectives, and continues with developing the strategies for implementation. This is then followed by determining the means and resources for meeting the objectives, including the organisational requirements, and it finishes with designing the means of control and standards to measure the realisation of goals (Fu et.al., 2006).

### 3.3.3 Phase M-P into 'Manageable or Deliverable Chunks'

To alleviate the complexity of a M-P, many authors (such as Malach, 1998; Hanh and Ruppel, 2008), recommend that projects be broken down into 'manageable chunks or logical blocks', each with its own distinct start and end.

The structure of the programme, route map, key stages and milestones, as well as end deliverables should also be established in order to increase M-P performance (Malach, 1998). The planning work should be documented and articulated in plans which can be used as guidelines for execution, authorisation, communication, co-ordination, and control (Laufer et.al., 1996; Abdullah, 2000, Aritua et.al., 2009).

#### 3.3.3.1 Lessons learnt from CG

Consistent with the suggestions made by many authors (such as CCTA, 1994 & 1996; Bradley, 1997a & 1997b; Pellegrenelli, 1997), the majority of the interviewees also agreed that evaluation of the M-P programme, resources and MPM benefits is a continuous process. This should be executed at the end of each tranche. However, the findings of this research indicate that evaluation of other elements, such as design, finance, risk, quality, environmental, health and safety, of each project within the M-P, are also important for construction M-Ps. Continuous monitoring of these elements is needed and their effect on milestones, schedules, and resources consumption for the project should also be evaluated and reported to the M-P manager. The M-P manager should then check the progress of the project against the M-P Implementation plan. Any changes have to be weighed-up, and corrective measures then made to ensure that all projects achieve the benefits planned.



### 3.3.4 Policies, Procedures and Standards

Based on the author's research findings, the participants emphasise the need to establish policies, procedures and standards to define the "rules of the road" for all projects. The necessity for these documents in managing M-Ps has been agreed upon by many authors, such as Palmer (1997), Hanh and Ruppel, (2008). Abdullah (2000) also stresses the importance of imposing discipline to ensure the procedures and standards stick, and that procedures should be brief and require only a minimum of paperwork and approvals.

### 3.3.5 Consolidation and Analysis

To alleviate difficulty in setting a good scheduling system and managing resources, Hendricks et.al. (1999) Hanh and Ruppel (2008) recommend that project and M-P managers consolidate projects at the level of detail that suits the resource/department/portfolio manager's analysis. Project interfaces and dependencies must be monitored regularly (Hanh and Ruppel, 2008). With projects consolidated at the appropriate level, analysis becomes possible.

### 3.3.6 Systematic Monitoring, Updating and Re-Planning

To alleviate the problems mentioned in section 2.1 further, many authors (such as Laufer, 1997, Abdullah, 2000) recommend that M-P managers should simultaneously monitor the utilisation of the resources and the achievement of objectives (due to changes in the project's environment) by scanning the environment and monitoring the changes in the critical assumptions to allow timely revisions of the plan and occasionally also of objectives. To do this, the M-P manager needs project managers to report project status and variances regularly (Hanh and Ruppel, 2008). Progress must be measured, and adjustments should then be made to the M-P Implementation Plan to reflect the status of the project portfolio.

DH\* (1999) stresses the importance of the project manager of each project predicting future events regularly to identify potential variances. According to him, this can be achieved by identifying trends or by tracking the logic sequence to predict future delays and resultant disruption.

According to DH\* (1999), the overall portfolio and component projects for the CG facilities were established in 1996 in the "Sports Facilities Development Plan", immediately after Manchester won the CG bid in November, 1995. Projects had been prioritised, and the sequence of projects, together with their interdependencies, were worked out and presented in the same report. For example, the feasibility studies and the design of the Swimming Pool and the Sportcity facilities, especially the Stadium, had been prioritised as very important and to be carried out early due to their high level of complexity. Hence, the work on these facilities has been underway since mid 1996.

The need for a planner was recognised as essential in early 1998, when DG\* and DH\* were appointed to oversee the programme and progress for the Sportcity. According to CLA\*, the objectives of appointing the planners were to establish realistic targets for achieving the pre-construction programme for the Stadium. They produced an integrated suite of programmes, charts, drawings and method statements, which logically analyse the project sequencing and timing and provide the team with the opportunity to fully understand the strategy of the Sportcity development.

DG\* and DH\* highlighted how the process of planning the M-P is about teamwork and must not be seen as under the sole jurisdiction of a single individual. In this M-P, all MPM team members (for example, the client, designer and contractor) provided information on time-scales, costs and resourcing needs for each project, and agreed to the plan for each stage of the project. Milestones for drawdown of grants were also included as part of the schedule of costings.



### 3.4 Integrated Management Information System

To mitigate further the problem (iii) and to ensure better communication and co-ordination in MPM process, many authors (such as Laufer, et.al., 1996 and Fu et.al., 2006) suggest the use of "integrated management". Laufer, et.al. (1996) define the term "integrated" as "*the preparation of all functional plans (for example scope definition, design basis, budget, schedule, human resources, logistics and support, contracting and procurement as well as construction) simultaneously and interdependently*".

To facilitate the integration of those functions, authors such as Hennings, (1999), Abdullah, 2000) suggest the use of an integrated management information system (MIS) to manage the vast amount of data generated by MPM. Hence, a centralised database is needed where selections of projects can be consolidated for analysis from different perspectives (Yager, 1997; Amos and Aitken, 2004).

Gibson & Marlow, (1998) who reviewed the implementation of a portfolio management system in a pharmaceuticals research and development business states that the integrated MIS acts as a communication centre, providing all necessary documents, and maintaining status reports on all projects in the M-P. This is called a M-P Support Office (Hennings, 1999, Abdullah, 2000), which also provides a wide range of other services to the M-P manager and project managers, including administrative support, staffing or resources allocations, and change control.

Ireland, (1997) and Abdullah (2000) recommend the use of a standardised and open database system in the M-P support office, to ensure more efficiency in data entry, retrieval and data manipulation to suit the dynamic requirements of the MPM. This can become a template to be used for other M-Ps and for holding details of corporate resources and calendars (Olford, 1994).

#### 3.4.1 Advantages of using the Web

In recent years, web-technology has been recognised by many authors (such as Elkins & Dudek, 1999, Abdullah, 2000), as a way to create *integrated data management tools* that enable organisations to automate systems for planners, visualise various types of planning information to aid decision-making and, most importantly, *save money* (Amos and Aitken, 2004). The advantages provided by web-based reporting tools, such as easy access anytime from anywhere in the world and the ability to convert documents from many sources into HTML documents that can be reviewed, commented on if necessary, and easily disseminated to be viewed in a variety of web browsers (Abdullah, 2000), *enhance communication abilities for the MPM*.

#### 3.4.2 Lessons learnt from CG M-P

Many interviewees acknowledge a big gap in the construction industry in terms of providing integrated management information systems that allow all the team to communicate with each other more efficiently. Reasons given for non-adoption of this practice include:

- construction projects are one-off,
- each project is different and unique and,
- each project requires a different set of teams.

Hence, it is not viable to establish a standardised system for all teams to use. However, it has been agreed that it is appropriate to establish a standardised system for MPM within one organisation (M-P type one), where the M-Ps are continuous and projects keep being added over an indefinite time-scale. With a standardised system, knowledge can be shared within the same organisation across the country. It is also suitable for M-P type two (when the projects are

prototype and located on various sites), where similar data can be used over and over again on many projects.

With regard to M-P type three, the importance of having a standardised system amongst the designers, has been highlighted by some interviewees in order to co-ordinate the activities at the M-P level, such as the co-ordination of design for the master plan, and the co-ordination of overall programme, time and cost. It is also important to have such a facility during the construction stage of the projects, to ensure full co-ordination of the construction logistics. The advantage of appointing the same consultants (such as designers and cost consultants) for projects within the same site is also highlighted to improve co-ordination of the M-P and to improve the efficiency of the M-P by using the 'built-up' knowledge from the previous project.

According to DH\* (1999), organisations using a MPM approach must consider new methods of collecting information and reporting that information to the proper individuals. Over the years, this communication has taken many forms and has slowly evolved into the combination of Fax, Mail, and Phone (Davies, 1999; Aritua et.al., 2009). Now the internet and web technology, as well as e-mail are used to provide new alternatives for communication, which are easier to use and access. Products supporting videoconferencing, data sharing, co-working on applications, team whiteboards, and other functions are readily available and within the reach of a project team (Abdullah, 2000). With this modern technology, MPM teams can send copies of documents, spreadsheets, presentations, and other project information to just about anyone with a computer and a modem.

### 3.5 Developing a M-P programme

After the MPM team has determined the initial level of detail required by the work, and the financial schedules, and has identified the appropriate activities, the development of the intelligent activity identifiers (IDs) for the M-P programme can commence. According to Hans et.al., (2007), this step requires the programmer to establish a multilevel coding convention that will help organise the order in which the activities are stored in the database. Ireland (1997) also agrees that standard multi-coding system scheme is needed for M-Ps, providing consistent numbering between projects for comparison purposes when assessing cost, time, and quality efficiencies.

Once activity IDs have been established, the next task is to develop activity, cost, and resource codes for the M-P. According to Ireland (1997) and Abdullah (2000), it is important to integrate work schedules together with cost, financial schedules, and funding milestones. They believe that this is because the budgets must be properly managed if the M-P is going to be completed successfully. In most cases the MPM team, through co-ordination, monitoring, and reporting, must bridge the gaps between the funding parties and the parties actually responsible for making the expenditures to ensure that the budget remains intact and operational. Hans et.al., (2007) also suggests that with this integrated schedule, the MPM team would have the ability to develop a series of cash-flow reports that assist in monitoring both the M-P expenditure plan and the funding itinerary.

#### 3.5.1 Lessons Learnt from CG M-P

Based on the author's investigation on the CG M-P, the client and the other consultants have established M-P support office and have selected appropriate project management and supporting software for use by all organisations involved in the M-P planning and control. Most of the design and specialist work, such as architectural design, civil and structural design, mechanical and services for the Stadium and United Kingdom Sports Institution (UKSI) main buildings, are provided by DE1\* and its daughter organisations. For example, the master planner (PM5)\* and the design consultants (DE1)\*, have their own in-house CAD Management unit which is responsible

for the production and control of CAD drawings, ranging from the master plan to detailed drawings. This department is also responsible for the coding, storage and distribution of drawings issued by the master planning team, and design teams. It is also responsible for managing the distribution of electronic copies of the master plan and design information. With the establishment of the M-P support office, information related to the design of the facilities is well taken care of.

### **3.6 Change Management**

Most projects or M-Ps suffer changes during their life cycle. These changes could be in the form of the M-P work scope, quality, costs, schedules, specifications, claims, change orders, and design changes. The M-P manager must accommodate changing needs, benefits, and environments during implementation (Combe & Githens, 1999; Abdullah, 2000) and communicate these changes to all relevant MPM teams.

To control changes to a M-P, many authors have adopted the concepts of 'change management' (Pellegrenelli, 1997) or 'configuration management' (Levene and Braganza, 1996). Both concepts address similar issues.

#### **3.6.1 Understand Stakeholders' Needs and Requirements**

As mentioned in section 3.2.1, understanding stakeholders' needs and requirements is important in order to establish a sound M-P brief and business case. In addition, many authors (such as Gray, 1998; Lauying, 2007) also agree that understanding their requirements also leads to minimisation of changes in the M-P life cycle. A structured and facilitated interaction between stakeholders, and a continuous reassessment of the situation through iteration, based on stakeholders' needs, could also help to control changes in the projects.

#### **3.6.2 Establish Comprehensive Change Control Procedure**

Many authors (such as Gray, 1998; Abdullah, 2000) emphasise the necessity of establishing comprehensive control procedures to allow timely impact analysis and benefits reassessment throughout the M-P. The control procedures should include: weekly status reporting, issue management, change management, workplan actuals reporting, and consolidated resource forecasting (Hanh and Ruppel, 2008).

#### **3.6.3 The Role of the Automated System**

To facilitate the implementation of change control procedures, several authors (such as Elkins & Dudek, 1999; Abdullah, 2000; Hanh and Ruppel, 2008) stress the importance of establishing these procedures within an automated system to aid decision making. According to TØrsleff (1998), an integrated system of simple, accurate time and expense accounting can provide a framework for notifying staff of weekly tasks and other work, progressing projects and service requests, as well as charging work to customers, explaining changes and measuring performance.

However, due to the dynamic nature of MPM, Stanion, (1999) emphasises that the system should be flexible i.e., "*able to manage the disruptive process without destroying the organisation by transforming from a rigid, formal structure to a more adaptive structure*".

#### **3.6.4 Monitoring and Assessing Changes Regularly in Incremental Steps**

Both internal and external changes in the environment should be monitored and assessed regularly to allow timely revisions of the plan and, occasionally, also of the M-P's objectives. Pelegrenelli,



(1997) believes that regular improvement of existing systems, infrastructure or even business processes, via *"incremental overhaul of the system or facility itself"* is important in MPM. His view is shared by Hanh and Ruppel (2008) who believes that the existing system or infrastructure should be improved in small, regular, incremental steps, to give better control over expenditure and changing requirements, thus better serving the strategic objectives of an organisation.

### 3.6.5 Establish M-P Change Board

Based on her research findings, Abdullah, (2000) emphasises the importance of establishing a M-P Change Board, representing the client and authorised to approve changes. According to Stanion (1999) as in Abdullah (2000), this is important to ensure that the client is aware of various changes to the M-P, and understands their impact on the realisation of M-P benefits. Changes in the design and costs were minimised by:

Close liason with M-P stakeholders; and

- Establishment of change control procedures for the programme.

For example, according to DG and CLA, any proposed changes in design, scope or method relating to projects within the Sportcity, will be investigated in conjunction with Planners, the Master Plan Designer and the Design Consultants to ascertain the effect on cost plans, budgets, cashflow and funding drawdown, outputs, and the Master Plan and programme.

The process of approval of changes is given in Figure 1.0. Requirements for changes identified by the design consultants will be investigated by the cost manager in conjunction with the planners and the master planner. A report will then be submitted to CL1 for approval of the changes. Once formal authorisation from CL1 has been received the change will be incorporated into the master plan, programme and cost management and reporting systems.

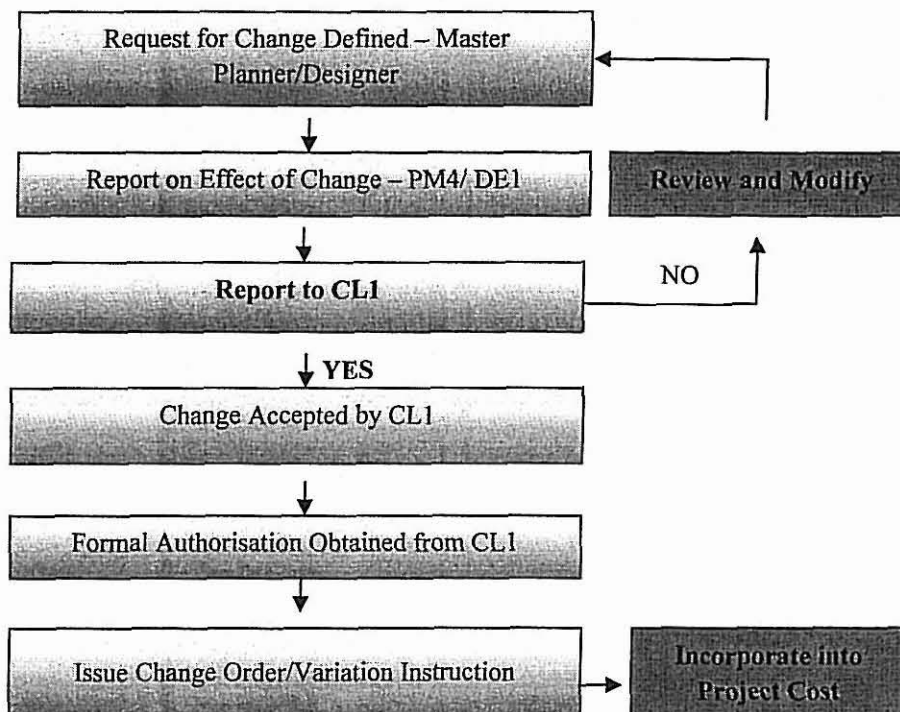


Figure 1.0 : Change Management Process

### 3.6.5 MPM Teams Participation

Since MPM consists of multi-disciplinary teams, their participation in controlling changes is also important. A high degree of collaboration and participation between the architects, deliverers and recipients of the M-P (Abdullah, 2000; Hanh and Ruppel, 2008) engenders acceptance, which is crucial to success (Klijn et.al., 1998). MPM teams have to be proactive in addressing apparent problems (TØrsleff, 1998), and must communicate changes to the M-P manager. This is important so that the M-P manager can co-ordinate these changes and control chaos in the M-P (Chapman, 1998).

## 4.0 CONCLUSION

This paper has discussed best practices in managing communication and to enhance co-ordination in the MPM process for the building and construction industry. Best practices that have been highlighted are: the importance of establishing sound M-P goals and strategies, M-P brief and business case; creating good working environment for the MPM team; managing M-P planning and resources, consolidate projects at various levels; develop a M-P programme, use the integrated management information system and manage change systematically and regularly. Some lessons learnt from the CG-MP have also been highlighted to reinforce the importance of the practices being discussed.

The adoption of the said practices can help every member of the team to see how their decisions, interactions interrelates, and would provide a better understandings of how their decisions and behaviour impact overall performance and how they can help to ensure overall success of the M-P's delivery.

## REFERENCES

- Abdullah, A.M., & Vickridge, I.G., (1999), "Best Practice for MPM in the Construction Industry", Proceedings of the COBRA 1999, RICS Construction and Building Research Conference, Vol.2, pp.169-179, The RICS London and University of Salford, Salford.
- Abdullah, A.M., (2000), ""Best Practices for Multi Project Management in the Construction Industry", PhD thesis, UMIST Manchester.
- Amos, Q.C., Aitken, O.C., (2004), "Project Management for All Seasons – Financial Risk Mitigation in a Challenging World", *Proceedings for PACRIM 2004 Congress*, Sept. 19-22, Adelaide, Australia.
- Anderson, M.T., (1999), "Assessing Supply Chain Performance: Program Requirements Integration", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, USA.
- Aritua, B., Smith, N.J., Bower, D., (2009), "Construction Client Multi-Projects – A Complex Adaptive Systems Perspective", *International Journal of Project Management*, Vol. 27, Issue 1, pages 72-79.
- Cagno, E., Caron, F., & Trucco, P., (1998), "Project Prioritisation in a Multi-project Environment", Proceedings of the 14<sup>th</sup> World Congress on Project Management, Slovenia, June 10-13, Vol.1. pp. 145-153.
- CCTA, (1994), "A Guide to Programme Management", Programme and Project Management Library, Central Computer and Telecommunications Agency, The Stationary Office, London.
- CCTA, (1996), "Programme Management", Programme and Project Management Library, Central Computer and Telecommunications Agency, The Stationary Office, London.
- Chapman, M.R., (1998), "Benefits Management – Going Beyond Program Management", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.

- Combe, M. W., Githens, G. D., (1999), "Managing Popcorn Priorities: How Portfolios and Programs Align Projects with Strategies", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Davis, D.L., (1999), "Putting the Project Management Portfolio into Web Space", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Daw, C., (1999), "Managing Multiple Projects Is Much Like Raising Teenagers... Managing Resources Over Multiple Projects", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Eager, D., (1997), "Sydney 2000 Olympic Games: A Project Management Perspective", Proceedings of the Project Management Institute 28<sup>th</sup> Annual Seminars & Symposium, Chicago, Illinois.
- Elkins, T., & Dudek, D., (1999), "Integrated Resource and Project Management", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Eskerod, P., (1996), "Meaning and action in a multi-project environment", International Journal of Project Management, Vol. 14, No. 2, pp. 61-65.
- Fleming QW and Koppelman J M. 1996, "Integrated project development teams: another fad....or a permanent change", International Journal of Project Management, Vol. 14. No. 3, pp. 163-168.
- Fu, D.C., Lin, Z.Y., Yang, L.Y., (2006), "Enterprise Program Management System in Construction Industry", *Proceedings for the 20<sup>th</sup> IPMA World Congress on Project Management*, Vols. 1 & 2, pages 678-684.
- Gibson, L.R., & Marlow, S.P., (1998), "A Practical Approach to Portfolio Management in the Pharmaceuticals Industry", Proceedings of the 14<sup>th</sup> World Congress on Project Management, June 10-13, Slovenia. Vol. 1, pp. 154-160.
- Gray, N. S., (1998), "Change Budget: One Key to Never Padding Estimates Again", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Hanh, L.Q. and Ruppel, U., (2008), "Robust Process-Based Multi-Project Scheduling for Construction Projects in Vietnam", *Proceedings for the 7<sup>th</sup> European Conference on Product and Process Modelling*, Sept. 10-12, Sophia Antipolis, France.
- Hans, E.W., Herroelen, W., Leus, R., (2007), "A Hierarchical Approach to Multi-Project Planning Under Uncertainty", *Omega International Journal of Management Science*, Vol. 35, issue 5, pages 563-577.
- Hardy, L., & Chaudhuri, T., (1998), "Managing Large Projects in Rapidly Changing Environments: Planning the "Unplannable" Project – A Case Study", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Hastings, C., (1996), "Development Process for Improving Project Performance in Multi-Project Based Organisations", Proceedings of the "IPMA 96" World Congress on Project Management, Paris, France, pp. 171 – 178.
- Hennings, C.M., (1999), "Proposing a Program Office for a Service Organisation", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Howard, P. A., (1998), "Megaproject Management Using Program Management Techniques", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Hu, F., Gu, W.J., Li, L., (2009), "Research on Conflict Measurement Model of Project Managers under the Enterprises' Multi-Project", *Proceedings for the 8<sup>th</sup> Wuhan International Conference on E-Business*, Vols I-III, pages 1850-1855.
- Ireland, L.R., (1997), "Managing Multiple Projects in the Twenty-First Century", Proceedings of the Project management Institute 28<sup>th</sup> Annual Seminars & Symposium, Chicago, Illinois, pp. 471 – 477.
- Jacob, K., (1999), "Executing Projects within Portfolio Management in Large Multi-Business, Multi-functional Organisations", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Jones, K., & Weiskittel, J., (1997), "Program Management: A Key for Integrated Healthcare Delivery Systems", Proceedings of the Project Management Institute 28<sup>th</sup> Annual Seminars & Symposium, Chicago, Illinois, pp. 975- 980.



- Kalmes, K. & Lewis, F., (1998), "Changes are Coming for 2000: Approach Project Management with Two Hats, Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Klijn, E., Kroep, L. and Van Mal, H., (1998), "Managing Cost and Time of Engineering Activities in a Multiproject Organisation", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Knutson, J., (1994), "Managing Multiple Projects in a Matrixed Organisation", Proceedings of the Project Management Institute, 25th Annual Seminar, /Symposium, Vancouver, Canada.
- Laufer, A., Denker, G.R., & Shanhar, A.J., (1996), "Simultaneous Management: the key to excellence in capital projects", International Journal of Project Management, Vol. 14. No. 4. pp. 189-199.
- Lauyang, D., Yongdong, S., Chunfang, Y., (2007), "Strategy Implementation by Project Portfolio Management in Construction Enterprise: Success Factors Reflected from Empirical Study", *Proceedings of 2007 International Conference on Construction and Real Estate Management*, Vols. 1 & 2, pages 31-35.
- Ledet, W. J. and Maroulis, S. J., (1998), "Improving Project Performance with Simulation and Practice", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Lee, D.R., Sweeney, P.J., & Shaughnessy, G.J., (1999), "Developing Commitment and A Positive Team Environment", Proceedings of the 30<sup>th</sup> Annual Project Management Institute 1999 Seminars & Symposium, Philadelphia, Pennsylvania, USA.
- Malach, J. D., (1998), "Phase Gate Management – Best Practices and Methods", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Manchester City Council, (1994), "City Pride – A Focus for the Future", Manchester City Council, Manchester.
- Odum, R. F., Carrier, L., Babich, N., Hunt, B., LePoint, R. and Shedd, J., (1998), "Program Management Process on F/A – 18E/F – New Directions", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Olford, W.J., (1994), "Why is Multiple-Project Management Hard and How can We make it Easier?" Proceedings of the Project Management Institute 25th Annual Seminar/Symposium, Canada.
- Payne, J. H., (1995), "Management of Multiple Simultaneous Projects and State-of –Art Review", International Journal of Project Management, Vol. 13, No. 3, pp. 163-168.
- Pellegrinelli, S., (1997), "Programme Management: organising Project-based change", International Journal of Project Management, Vol. 15, no. 3, pp. 141-149.
- PMI, (1994), "A Guide to the Project management Body of Knowledge (PMBOK)", Project Management Institute, Upper Darby, PA.
- Scheinberg, M., & Stretton, A., 1994, "Multi-project planning: tuning portfolio indices", International Journal of Project Management, Vol. 12, No. 12, pp. 107-114.
- Shi, Y.D., Chen, L., (2005), "Multi-project Coordinated Management Based", *Proceedings for 2005 International Conference on Construction and Real Estate Management*, Vol. 1 & 2, pages 525-528.
- Sommer, R. J., (1998), "Portfolio Management for Projects – A New Paradigm", Proceedings of the 29<sup>th</sup> Annual Project Management Institute 1998 Seminars & Symposium, Long Beach, California, USA.
- Strange, G., (January 1995), "Understanding Programme Management", Project, APM, pp. 10-12.
- Turner, J.R., (1992), "The Handbook of Project Based management: The Improving Processes for Achieving Your Strategic Objectives", McGraw-Hill, New York.
- Tørsleff, H., (1998), "New Approach to Management Solutions in Multi-project Environment", Proceedings of the 14th World Congress on Project Management, Slovenia, June 10-13, Vol. 1., pp. 166 - 180.
- Yager, S., (1997), "Managing Multiple Projects in Large IS Organisations", Proceedings of the Project Management Institute 28<sup>th</sup> Annual Seminars & Symposium, Chicago, Illinois, USA.