ROLE OF TIME MANAGEMENT IN MUNICIPAL'S URBAN ACTIVITIES, DUE TO THE EGYPTIAN'S LEGISLATIONS

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Abstract- Large cities in Egypt suffer spread of urban distortion phenomenon, which resulted from several causes; absence of project management concept is one of the most of these causes. Project management and its computer based applications; in terms of time management; is the latest and became one of the most spread trends in the modern building industry. Most of construction projects in Egypt do not implemented through project management concept especially the domestic housing projects that represent most urban activities which permitted and implemented under inspection of the Municipalities. The research attempts to highlight the importance of time management in managing the urban activities in Egyptian municipalities in terms of implementation of the permitted projects. At first the research reviews the Egyptian building legislations in terms of building permissions, and specifies the weaknesses in the legislations that influence the distortion in the cities' image that resulted from absence of the project management techniques. Then the research reviews the project management through two of most famous bodies that deal with the architecture and construction points of view. These lead us to the necessity of reviewing the most used project time management techniques and there computer based applications and define the optimum one to be used in municipal's urban activities. Finally the research links between the project time management and the building's legislations in terms of issuing and implementing the building permissions. At the end conclusion and recommendations impose some modifications for the building legislations to be taken in consideration.

Index terms- Engineering management, Municipal engineering, Public policies and local development.

I. INTRODUCTION

Building Technology is usually providing new trends in the building industry. The latest field in building technology is project management and its computer based applications. Most of construction projects in Egypt do not implemented through project management concepts especially the domestic housing projects that implemented under inspection of the municipalities. The Egyptian building's legislations stated that the municipality should inspects the implementation of permitted projects in accordance with a progress reports that submitted by the owner's supervisor engineer of the permitted project, without submission of baseline time schedule as one of the document required in permission's application to be reviewed with the mentioned progress report. Also it did not specify the form of the progress reports, and the maximum number of projects that the municipality should inspect simultaneously for a certain area, although the engineers syndicate specifies the maximum projects that should supervised simultaneously by the engineer. These weaknesses in legislations are influencing delay in performing the permitted projects and spread of urban distortion.

II. PROBLEM STATEMENT

Delay in performing the permitted works and spread of urban distortion resulted from:

- The difficulties that facing the municipality when inspecting the implementation of uncertain number of simultaneous permitted construction projects.
- Absence of using computer based applications in time management in order to facilitate the inspection of the permitted construction projects.
- Distortion of the cities' image that resulted from undefined finish date for the permitted construction projects

III. RESEARCH AIMS

The research aims to define the maximum number of building permissions that should be issued and simultaneously implemented in a certain area, and apply the time management techniques in implementing these permitted construction projects. These through commitment the applicant of the building permission to submit a baseline time schedule in a specific form and finish date, specifies the progress report form as well. Furthermore define a penalty for incompetence of achieve the submitted baseline time schedule. These aims can concluded as:

- Specify maximum number of building permissions to be issued and simultaneously implemented by the municipality.
- Specify the forms and computer based application to submit the baseline time schedule and progress report of permitted works to the municipality.

IV. RESEARCH METHODOLOGY

In an attempt to fulfill those aims, the research is based on the following methodology:

- Review the Egyptian building legislations in terms of inspection of implementation of the permitted construction projects.

- Review the project management definitions as new trend in building technology in terms of project lifecycle.
- Review the time planning as one of the project management tools that controls the construction projects. And demonstrate the most used time planning computer base applications.
- Linking between time planning techniques and Egyptian building legislations in terms of inspection of implementation of permitted construction projects.

V. EGYPTIAN BUILDING LEGISLATIONS

The third section of the building law No. 119 of 2008 reviews how to regulate the building works and how to issue a building permissions and in case of violation occurs. The majority of the municipalities work is issuing the building permissions, hence; follow up these permissions when its implementation starts.

A. Building permission

Issuing a building permission is depending on the compliance of the submitted document, with the provisions of the law. Fig. 1 illustrates the process of issuance of building permission.

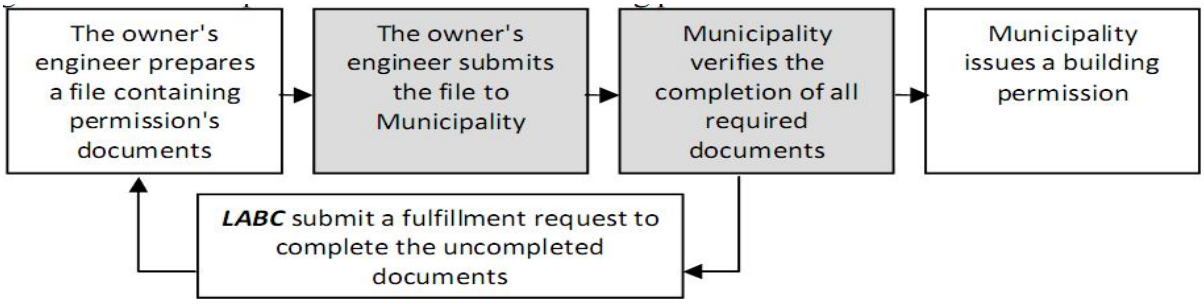


Fig. 1: Issuance of building permission Process [2]. (Adapted by the researcher)

As in Table I the Egyptian building law did not mention that the documents submitted to obtain building permission should contain a realistic time schedule in order to define the project duration, start date, and finish date.

Table I : Required documents for building permission [2]

Document	Required
Photocopy of the owner's ID.	□
The ownership documents.	□
The works estimated value	□
Site validation statement for building.	□
Three copies of the drawings.	□
Insurance policy if necessary.	□
Soil Report.	□
Structural calculation sheet.	□

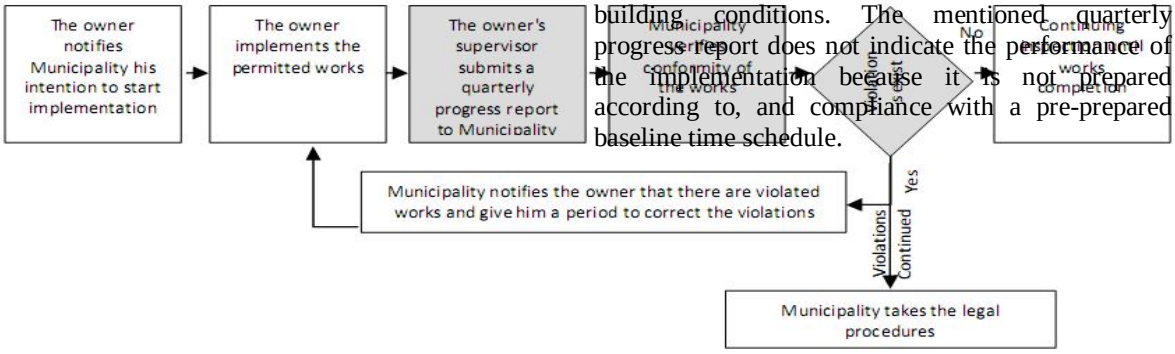


Fig. 2, the law mentioned that the owner's supervisor should submit a quarterly progress report to the municipality. Then the municipality verifies conformity of the works only according to the building conditions. The mentioned quarterly progress report does not indicate the performance of the implementation because it is not prepared according to, and compliance with a pre-prepared baseline time schedule.

Hence, how long time this project will makes occupancy in the road, and how long time the municipality will inspect this project. The law also did not mention how many projects should simultaneously obtain building permission as well. On other hand side the Egyptian engineering syndicate mentioned that, "each engineer has a maximum six implementation supervision statement to be exist simultaneously for buildings in the same site, or maximum four implementation supervision statement to be exist simultaneously for buildings if not in the same site" [1].

B. Permitted Work Implementation

The implementation phase of the permitted works illustrated in

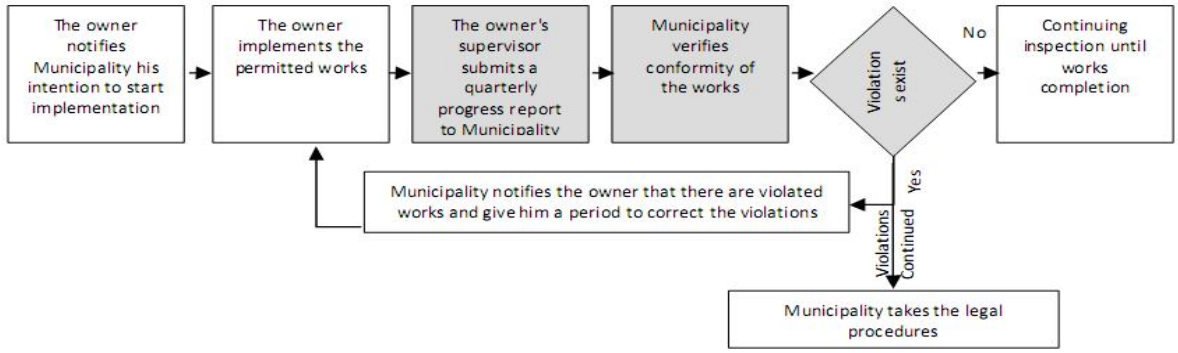


Fig. 2: Issuance of building permission Process [2]. (Adapted by the researcher)

VI. PROJECT MANAGEMENT

Project Management is one of the new trends in building technology, the Royal Institute of British Architects (RIBA) dealt with this trend in architectural point of view while the most famous body dealt with this trend in a general point of view was Project Management Institute (PMI). Each of those bodies divides the project into phases starting from the project's idea, and ending with the building's occupation. Those phases are sequential or interact each other as in Fig. 3. Project management defined as "The outline plan of work organizes the process of briefing, designing, constructing, maintaining, operating and using building projects into a number of key stages " [7].

In other words it is defined as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the appropriate application and integration of grouped project management processes." [6]. It is obviously that each of the above mentioned bodies divides the project into phases, these phases illustrate the project lifecycle.

A. Project Lifecycle

Project lifecycle is a collection of sequential or overlapping project phases or processes and can be mapped to the lifecycle structure for all projects as in Fig. 3. These phases or processes are determined by the management and control needs of the organization involved in the project, the nature of the project itself, and its area of application. The lifecycle provides the basic framework for managing the project, regardless the specific work involved.

The hatched area in Fig. 3 represent the interaction between planning, Execution, and monitoring phases, which the municipalities involve starting from issuance of the building permission ending with building's occupation through implementation of the permitted construction project.

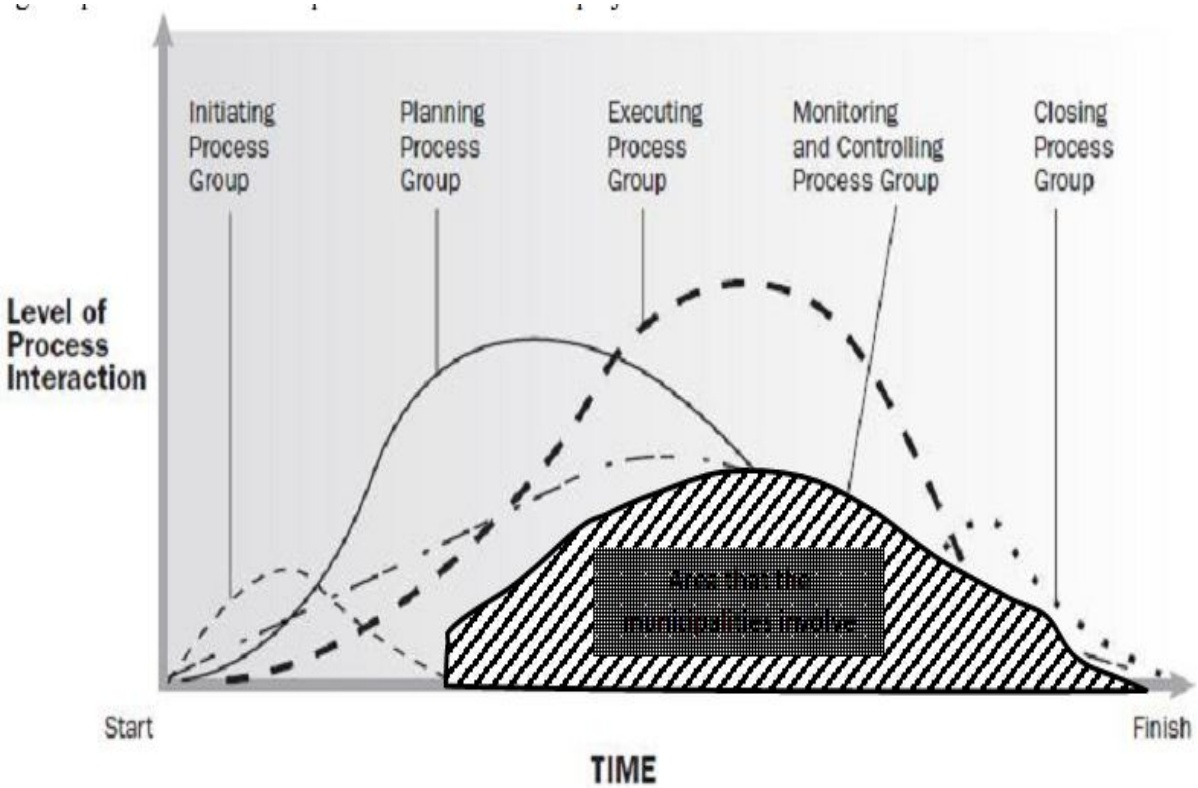


Fig. 3: Interaction between projects' Phases or Process Groups [6]. (Adapted by the researcher)

B. RIBA Plan of Work

RIBA plan of work first developed in 1963, for half a century it has been the definitive U.K. model for the building design process and project management. Table II**Error! Reference source not found.**.

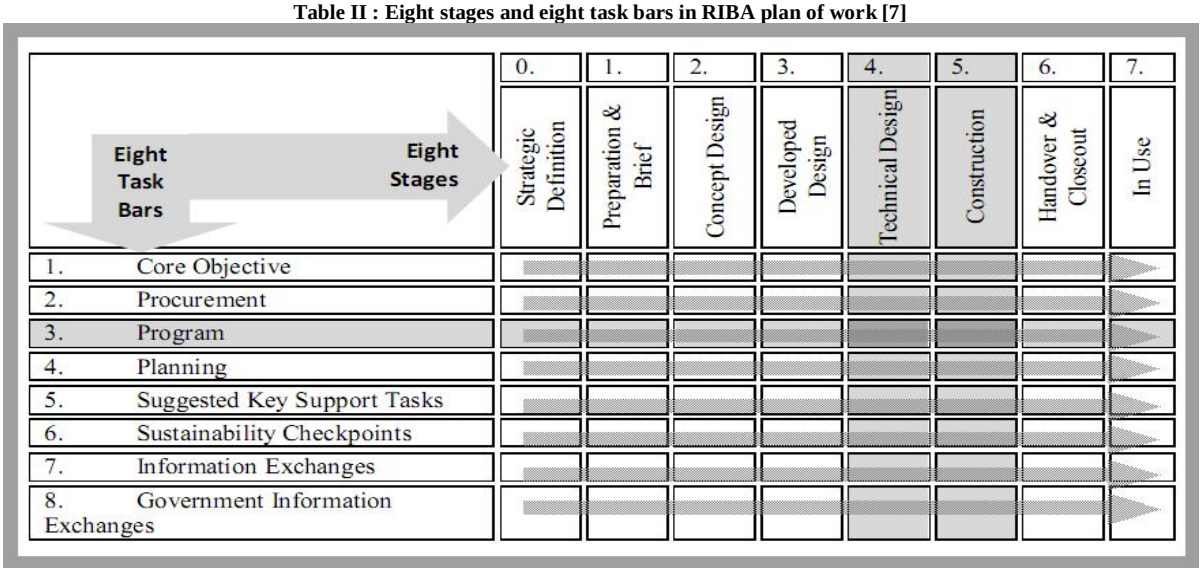
The RIBA Plan of Work is not a contractual document but it is a model to direct project participants to various tools and supplementary core documents used by a project team, including Table II. The RIBA plan of work task bars –as illustrated in

Table II- do not illustrate an explicit topic for the project time management and planning. However, the project program task bar contains this topic implicitly.

This model delivered through eight stages which should be performed through eight task bars as illustrated in

documents relating to professional services contracts, schedules of services and project protocols. The eight stages of the RIBA plan of work are defined by the numbers 0–7 as in

Table II : Eight stages and eight task bars in RIBA plan of work [7]



This task bar is essential because the stages of the RIBA Plan of Work are generally sequential and follow the progression of a project from commencement to completion and beyond. This leads us to realize that the project program task bar underlines the need on every project for a project program that sets out the duration of each stage and any supporting activities. This program may developed through the design program that prepared by the lead designer, with contributions from the Table II.

Table III. The five project management process groups are required for any project. Also they have clear dependencies and are typically performed in

Table III. "A Knowledge Area represents a complete set of concepts, terms, and activities that make up a professional field, project management field, or area of specialization. These ten Knowledge Areas are used on most projects most of the time" [6].

other designers, and the more detailed construction program that prepared by the contractor and reviewed by the construction manager engineer. A project program has been a core requirement of collaborative contracts for some time as it ensures that each party is involved in the process of agreeing timescales. The municipalities as in Egyptian building legislations are involving the intersection between the Technical Design and Construction stage and the program task bar as shown in

C. PMI Project Management Body of Knowledge

PMI divides the project management into five process groups as in each project and interact with one another. Each project may managed through but not limited to 47 project management processes are further grouped into ten separate Knowledge Areas as illustrated in

Project teams should utilize these ten Knowledge Areas and other Knowledge Areas, as appropriate, for their specific project. These 47 project management processes distributed crossly between the project management five process groups and the project management knowledge areas as in Table III. Project Time Management process is normally takes place in the Planning Process Group.

When this process is updated by an Executing Process Group processes or activities, then monitored and controlled by a Monitoring and Controlling Process Group, it is not considered a new process within the Executing or Monitoring Process Group but is still a Planning Process Group process or activity. The intersection between Time management in one side and each of Planning, executing, and monitoring processes groups in other side represents the area that the Egyptian municipalities involve.

Table III : Matrix illustrates process groups versus knowledge areas [6]

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring & Controlling Process Group	Closing Process Group
Integration Management					
Scope Management					
Time Management		Time Planning Process Group		Time Planning Process Group	
Cost Management					
Quality Management					
Human Resource M.					
Communications M.					
Risk Management					
Procurement Management					
Stakeholder Management					

TIME PLANNING

This part will introduce the most used scheduling methods. Project time planning -in most- is represented in graphical manner through several planning techniques. Charts are the most used method to present any project time planning, the most used time planning methods are "Gantt, Program Evaluation and Review Technique (PERT), and Critical Path Method (CPM)" [3]. In all above mentioned time planning methods the project is consists of group of tasks, while task defined as "the basic unit of interest. It is some significant activity the group will need to perform to accomplish its goals. These goals may include the project itself " [3]. Each task should include a clear name or description, original duration, dependencies, start, and finish date. Through tasks original duration, dependencies, start, and finish date, the overall project start/finish dates may defined.

A. PERT Chart Method

PERT chart is a project planning tool used to schedule, organize, and coordinate tasks within a project, this method were developed by the U.S. Navy in the 1950s to manage the Polaris submarine missile program. It uses a connected series of nodes to make explicit dependencies between tasks. In addition, the order of tasks is given by the flow of the connections left to right as in Fig. 4. When the nodes are events, here numbered 1-8 which occur on completion of tasks. Lines connecting events are tasks which have a calendar duration noted. CPM shares the same characteristics as PERT chart and the two are often lumped together as one technique, but CPM represents an explicit indication of the critical path in bold lines as shown in Fig. 4. Tasks that lie along the critical path cannot be delayed without delaying the finish date for the entire project.

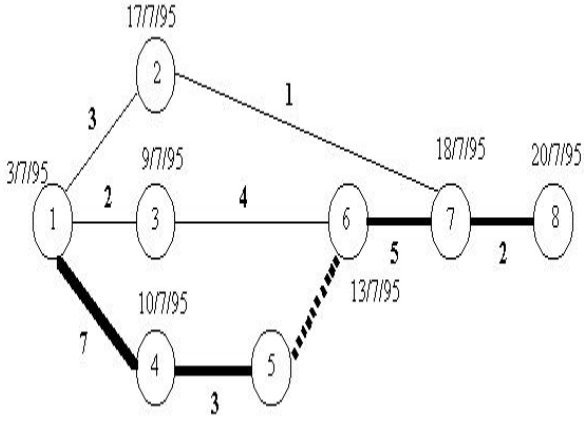


Fig. 4: PERT chart with imposed CPM as Bold [3]

B. Gantt chart method

Gantt chart is a visual representation of a project schedule, in another word it called bar chart. It is also considered as the popular and readable graphical chart that resulted from CPM and PERT chart's calculations. It shows the start and finish dates of the different required elements of a project. It was invented in the early 1900's by Henry L. Gantt, an American engineer and social scientist. It is useful in planning how long a project should take and helping to sequence the events by laying them out in the order in which the tasks need to be completed.

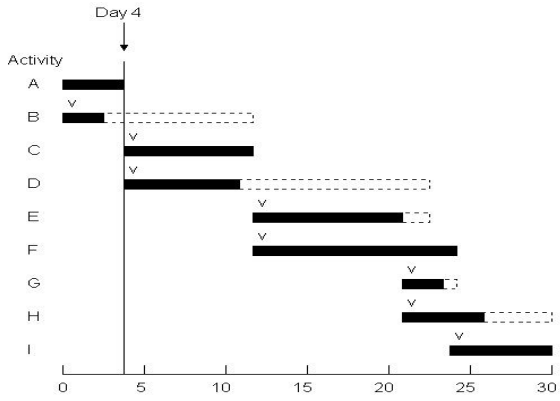


Fig. 5: Gantt chart Illustration [4]

As illustrated in Fig. 5, tasks are shown on the vertical axis, and the project time span is represented on the horizontal axis. Each task has a corresponding bar that shows the time span required for that task. The bar can be filled in to show the percentage of the task that has been completed. Gantt charts also indicate dependencies.

During the course of monitoring a project, useful additions to the basic bar chart include a vertical line to indicate the current date. Fig. 5 illustrates a hypothetical project state after 4 periods is shown. "Bar charts are particularly helpful for communicating the current state and schedule of activities on a project. As such, they have found wide acceptance as a project representation tool in the field" [4].

There have been various schemes for mechanically linking activity bars to represent precedence, but it is now easier to use computer based tools to represent such relationships, through many software applications available for creating Gantt charts, as well as functions in popular programs especially in Egypt such as Primavera Project Management and Microsoft Project. NASA [5] developed a methodology to evaluate the above mentioned project management software according to the scale in Fig. 6. Whereas score of (1) means that the software does not meet the criteria requirements, score of (2) means that the software meets the criteria requirements, and score (3) of means that the software exceeds the criteria requirements.

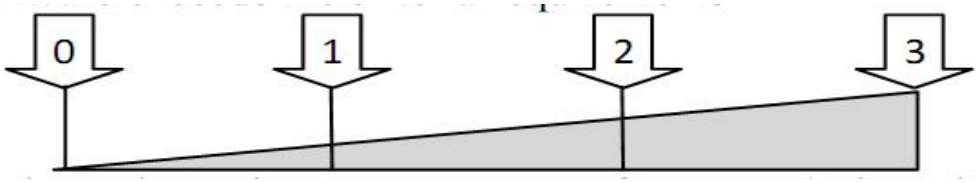


Fig. 6: Scale to evaluate the project management software [5] (Adapted by the researcher)

Table **IV** illustrated that the higher score and most popular software to be used project management is Primavera Project Management.

Table IV : Summary of the final criteria evaluation results [5] (Adapted by the researcher)

Evaluation Criteria		Workgroup Capabilities	Network	Ease of Use	Project Scheduling Methodology	Project Task/Field Features	Base lining and Tracking Progress	Calendar Features	Cost Management Features	Risk Management Features	Project Reports	Management Reporting	Average of Criteria
Score	Primavera Project Management	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.7	1.7	1.8	2.0	2.0
	Microsoft Project	2.3	1.5	2.3	1.9	2.0	2.0	2.0	2.0	1.0	2.0	1.8	1.9

Linking building legislations with time planning

The inspection on the implementation of permitted construction projects is one of the roles of municipalities, but the most difficulty facing it, that the building law did not define a certain number of permitted projects to be simultaneously implemented, also it did not mention to submit baseline time schedule as one of the documents required to obtain the building permission, while Egyptian engineering syndicate specifies the maximum number of project to simultaneously supervised by six project for each engineer in one site. The engineer is represented as the inspector in the municipality, hence, in order to link between time planning and building legislations it is necessary to define the maximum number of projects to be simultaneously inspected by municipality is the result of multiplication of six and number of inspectors. Also a realistic baseline time schedule should be submitted as one of the recommended documents in order to obtaining a building permission, this baseline time schedule should be printed from primavera project management layout as in Fig. 7, and a soft copy should be submitted. The quarterly progress report of

the implanted project should be submitted as a printed report of primavera project management layout compared with the previously submitted baseline time schedule.

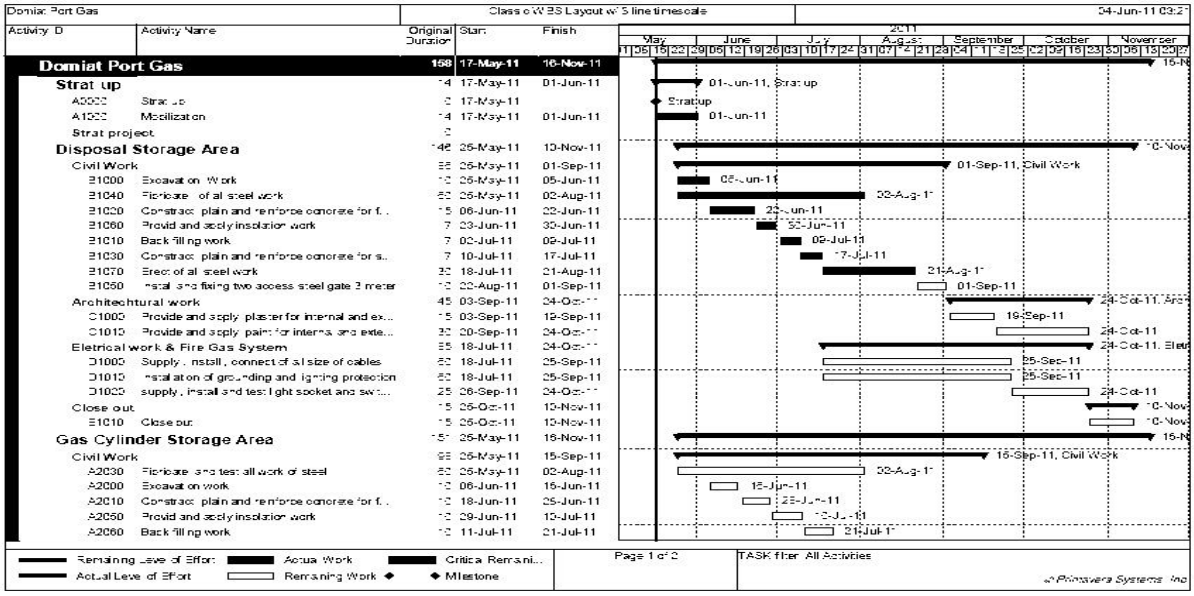


Fig. 7: Baseline Time Schedule Model

CONCLUSION

The research highlights the most major problems in municipalities, in issuance of building permissions and the inspection on the implementation of the permitted projects, also it emphasizes the importance of the project management concept in municipal's urban activities. Hence, we can conclude that:

- The Egyptian building legislations did not define a maximum number of simultaneously implemented projects which causes miss control in municipal's inspection.
- Absence of baseline time schedule in the required documents of building permission and undefined penalty when delaying the project finish date, influence spreading of undefined finish date projects and building violations
- It is a long period to submit the progress report, quarterly for implemented permitted projects.
- Each of RIBA and PMI emphasis the importance of time planning in planning, implementation, and monitoring phases.
- Gantt chart method illustrated with CPM have found wide acceptance as a project representation tool.
- Primavera Project Management and its layout reports is the most popular computer based application to be used in preparing the baseline time schedule and progress report of the permitted project.

RECOMMENDATIONS

In order to assure a good practice of the research conclusion the following recommendations should appended when modifying the building legislations.

- Requiring the applicant of building permission to submit a baseline time schedule for his project as a necessary document, in a specific form.
- Define the maximum number of simultaneously implemented permitted projects with six projects for each municipality's inspector.
- Requiring the owner's supervisor to submit a monthly progress report in a specific form, instead of quarterly progress report.
- Define a penalty for delaying in implementation the permitted projects.

REFERENCES

[1] Egyptian Engineering Syndicate, The Syndicate Services Guide, Eastern advertising company, Offset printing press, Egypt, pp. 45, 2011.

[2] Executive Regulation, Building Law 119 of year 2008, Official News paper, Egypt, Issue 82 (a) continued, article 112 & 128-135, 2009.

[3] Grover D., Graphical Project Planning Techniques - An Overview of Gantt, PERT, and CPM Charts, Michigan State University, Department of Electrical & Computer Engineering, pp. 1 & 4, 2002

[4] Hendrickson C., Project Management for Construction - Fundamental Scheduling Procedures, Version 2.2 Department of Civil and Environmental Engineering, Carnegie Mellon University, pp. 10, 2008.

[5] NASA, Enterprise Project Management Tool Analysis, White Paper, National Aeronautics and Space Administration, pp. 13-14 2002, http://www.gantthead.com/discussions/discussionsTopicContainer.cfm?ID=3339, 2011 .

[6] PMI, A Guide to the Project Management Body of Knowledge, PMBOK –Fifth Edition, Project Management Institute, USA, Pennsylvania, pp. 5&51, 2013.

[7] RIBA, RIBA Plan of Work 2013 Overview, Royal Institute of British Architects, UK, London, pp. 4, 2013, http://www.ribaplanofwork.com, 2016.

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