COORDINATION of ARCHITECTURAL CONCEPTS and CONSTRUCTION SYSTEMS

Case Study: The basic principles of building applications on Garuda II and sustainable development at the Dr.Kariadi-hospital in Semarang.

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Abstract: This paper reported the implementation of coordination between architectural concept and construction system in the area of dr.Kariadi hospital, in Semarang central Java. In principle, the coordination in the design-construction process can achieve the benefits of development by improving the quality of technical design. The use of Tartan Grid concept closely related to the coordination module that integrates seamlessly blend with the application of the concept of green architecture and design quality indicator (dqi) in architectural design can improve the quality of technical design. Furthermore, the construction phase was green construction methods will improve the performance of related construction projects of sustainable keyword: minimizing waste and pollutants, and achieved self sufficient. Matters are very useful for the future utilization of the building through post-occupancy evaluation.

Keywords: system, tartan-grid, technology, sustainable development.

1. INTRODUCTION

The study was conducted at area hospitals Dr.Kariadi, in Semarang, which is being carried out and the construction of several tall buildings on the other side there is a protected historic building (conservation) which functioned for the general administration of the hospital.

Construction industry, in principle, is a project development activities are constrained execution time, different characteristics of each project, taking place once completed, which consists of its phase process: planning (master plan, feasibility study), design / drafting (basic / concept, preliminary, detail engineering), procurement (procurement), construction / physical implementation, acceptance, operation and maintenance. Development of the construction industry has now reached from Conventional, Rational until industry especially in the scope of the use of technologies that are industrializing, then the goal as described above to be
more of a challenge to be achieved so that the project which has one of the characteristics: large volume, high technology, high risk, using a multi-year contract sides need consideration: efficient, effective and accountable. In this context, one of the things that led to the success of construction projects is through the establishment of a construction project organization is partnering/alliance. Forms of partnering in principle follows the basic pattern and the shape of the relationship in Client-Designer-Contractor (CDC) (2,9).

The basic principle of the construction projects that have been put forward by: (1, 2), as the Iron Triangle consisting of the cost, time and quality, which is called the external triangle according to (9). The triangular relationship of the above to manage the three main components of project management: Time, Quality, Cost (TQC) as a success. Furthermore, the success of a construction project initially measured based TQC, but appropriate development is now an element of customer satisfaction including (6). The success of achieving quality of building construction projects are very closely related to the application of quality management worth and worth doing at all stages of the project (7). In a construction project there are stages where the design and construction phases of these two stages together have a major influence and contribute to determine the process to achieve the final product-quality especially on technical sides.

If the sequence is summarized in the development process, the things mentioned above will consist of: preparation includes green technology applications; site development and green or circumstances existing land / sites, green design and human-construction bionic. All of these items starting from the use of The Tartan-grid closely related to the coordination-module.

Now the green concept, in line with the global warming issue and the Millennium Development Goals (MDGs, especially the seventh point: ensure environmental sustainability, and eighth point: develop a global partnership for development) where the target based on the achievement of certain time-existence strengthens the role of architecture as science and art.

The concept of Tartan-column grid which is a blend of the interface and the distance of each column are the size dimensions of the corner column (20x20 CM2) and middle columns (10x10 CM2) are Necessary to support the roof providing a full freedom in moving the infill components. The Tartan-grid applications generate a regularity in the construction of buildings related to the architectural, structural, mechanical and electrical, outdoor space design, preparation of working space for the physical development of contractor activities, coordinating all of the modules in a system.

In the design process of the building needed a tool to define and evaluate the substance of the design (Design Quality Indicator / DQI). Operational applications based on side-by-side: the impact, build quality, and functionality. These three elements each have overlapping areas (as added value) and the third focal point is the overlapping area of excellence (3). Vitruvius on architecture principles in his book 'ten books in architecture', asserted his opinion that the basic principle should show as utility structure (the purpose and use), Firmitas (materials and construction) and Venustas (proportion and scale). Matters of the building has undergone significant changes that building designers are faced with a variety of quality improvement requirements and constraints that must be met, for example: buildings are designed in harmony environment (green building) and innovative (7).
In principle, the system at this stage of the design process of a building characterized as buildings that are generated through: definition of scope, analyzed and formed into three-dimensional and has a specific nature. So in the process of construction of the building there is a design process that determines the success of the quality of the building. In the design process should be sufficient to control the performance of the main section. It continues to the end of the construction process so that the project goal is reached (5). Caused by the project team's performance does not meet the quality of the result in reworking (reworks) are many times that lead to exceeding the project schedule. This is a fundamental weakness of the building because the building the appearance aspect of the system was not achieved (10).

It is therefore very important and essential for any development of land in an area, especially in urban areas to prepare for the construction of the building and its environment in an efficient, effective and accountable as long as possible, by the use of environmentally friendly technologies.

2. METHODOLOGY

Identify the problem in this study: how the coordination of architectural concepts and construction system can run smoothly? Respondents consisted of project owners, project technical team, consultant designers, construction management consultant, Public Works Department of Human Settlements central Java, all of which carried an interview. The necessary data is primary data, taken directly from the sampling unit with equipment / tool with a list of questions / questionnaires.

The objectives of the study are to determine design of the developed area; and to develop a model of system to achieve building performance.

3. RESULTS AND DISCUSSION
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**Table Notes:**
- **Change in Design and Engineering:**
  - New Designs
  - Additions
  - Alterations

- **Change in Construction:**
  - New Operations
  - Additions
  - Alterations

- **Building Performance:**
  - Does not meet requirements
  - Construction performance
  - Building failure

**Diagram:**
- 1st International Conference on Engineering and Technology Development
- Universitas Bandar Lampung
- Faculty of Engineering and Faculty of Computer Science

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The Tenets on Floor Planning

- The floor plan should be designed to accommodate and balance the needs of the building users.
- The plan should be flexible enough to accommodate future changes in the building's use.
- The plan should provide adequate space for movement and activity within the building.

Construction Activities

- The construction process should be monitored to ensure quality and safety.
- The construction team should be well-trained and experienced.
- The materials used should be of high quality and meet all necessary standards.

Cost Estimate

- The cost estimate should be accurate and detailed.
- The estimate should include all necessary costs, including labor, materials, and equipment.
- The estimate should be reviewed and approved by all stakeholders.

Design Features

- The design should be aesthetically pleasing and functional.
- The design should be environmentally friendly and sustainable.
- The design should incorporate the latest technology and innovations.
The main characteristics of the coordination of architectural concepts in building design with construction system is a key to reduce the uncertainty of the final result as the performance of a building construction project. In this case the most important is the application of the system must be able to ensure coordination in the design and construction process so there is no conflict or disputes, rework, and even the failure of the construction. To achieve success, the coordination must be optimized in terms of the substance of design in sustainable construction management.

Based on the planning stage, then it should be considered important aspects, such as the scope of work, the proper equipment, competent personnel, working methods and organizational culture to support the success of the design and construction process as a whole project. Similarly, post-construction phase depends on strategic decisions that have been made in the planning stage. Finally, at the time held the post occupation evaluation will achieve optimal building performance.

Figure 1. shows the basic framework mindset. Framework shows the process and substance of the most influential and interact within the system boundary. If in it there is a small effect due to the impact of design quality is achieved, then there is sustainable development.

Table 1. shows that Stage of the Design Process in which there are elements within each classification grouping interact internally activities affect the next stage of construction process in which an interaction of internal activity, finally there is the human bionomic stage of the process.

Table 2. shows that The Tartan Grid concept developed multi role function has a significant influence on the following aspects: 8-10 floor high building design, construction activity, and open space design. Occurred relative
similarity in coordination modules: 80-800-80cm. In this case, the various substances design object has a correlation with the size of the basis in coordination module.

4. CONCLUSION

This study, however, indicate that the importance of the role that design should be able to achieve an increase in the optimal design of technical quality in the process of building projects. Design coordination will reduce the impact of construction failures, reworks and change order of items in the contract work. Contrary to the above, the technical quality of design coordination produces a better design from different point of view. The Author will continue study in monitoring the performance of post-occupancy evaluation related to the health care activities in this building and development of other buildings.

5. ACKNOWLEDGEMENTS

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6. REFERENCES


