

RESEARCH PROGRESS REPORT

CONFLICT MANAGEMENT IN TREN URBANO

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EXECUTIVE SUMMARY (EXTENDED)

Research objective:

This research proposes to identify and monitor the areas of potential conflict among the parties involved in the Tren Urbano project in San Juan, Puerto Rico. To achieve this, the organizational structure of Tren Urbano will be characterized, and then the information flows will be identified. The information flows and the organizational structure will be analyzed for potential conflicts, and recommendations will be made to avoid these potential conflicts. The above information on the Tren Urbano project will be organized for easy implementation of collaborative negotiations. This can be done by providing a chart of the parties priorities, interests, positions and attitude. Only the conflict avoidance part of collaborative negotiations will be completed in this research, further implementations of collaborative negotiations will be completed in further research. However, the final aim of collaborative negotiations must be kept in mind throughout this research with the aim to maintain a collaborative attitude in the project. Future collaborative negotiations research will extend into conflict resolution.

Motivation:

The development of large-scale civil engineering projects requires the collaboration of individuals from different specialties in order to address all the different issues that need to be resolved for the successful completion of the project. During the entire life cycle of the project, hundreds of organizations belonging to different specialties may participate. The roles and positions every organization takes are regulated by the contract agreed to prior to the beginning of

the project. Each contract is of a different type, which lead to varied positions and also varied interests in their contract. The resultant network of relationships and interests becomes extremely complex, and lead to many interest inconsistencies. In order to finish the project successfully, all parties have to work with each other closely and reconcile their different interests and conflicts. It is often hard to find a settlement at this level of complexity that satisfies all the interests of all the participants in the project. Thus, for most conflict resolutions, many participants spend great amount of time and money resolving those conflicts. In addition, when conflicts are not addressed quickly and effectively, the collaborative mode of the participants can be affected creating a hostile environment in which progress on the development of the project is slow or stagnant.

By identifying potential conflict early in the project and recommending changes to avoid potential conflicts, a less hostile environment and collaborative environment will occur. The recommendations will aim for a smoother project management. The schedule and budget will benefit from avoiding using time and money to resolve conflicts. Because of Tren Urbano's unusual delivery system, it is especially important to study inner workings of the project to identify if any potential conflicts are likely to occur. Even if changes are restrained under the current contractual relationships, recommendations will be made for future delivery systems in the additional phases of Tren Urbano.

Description of project and research methodology:

The Tren Urbano project phase I is an estimated \$1.5 billion, 17km heavy rail train system being built in San Juan, Puerto Rico. The project organization involves the PRHTA (Puerto Rican Highway Authority), GMAEC (General Management Architecture & Engineering Consultant), Siemens (STT), Redondo, Parsons Brinkerhoff, and many other parties, each with their own priorities, interests, and positions governed by their contractual arrangements. This complex network of relationships and interests leads to interest inconsistencies, which could lead to conflicts. The aim of this research is to identify and avoid potential conflicts by analyzing the organizational structure and information flows of the team, and then making recommendations for changes within those structures to manage conflicts better.

Current results:

From studying the project organization and processes, several issues that could lead to conflicts appear. One issue is that the matrix organization and the changing lines of control lead to confusion. This is evident from the project participants' differing perceptions of the organizational chart. The PRHTA employees, i.e. the Contract Managers, report to PRHTA's Executive Director, whereas the GMAEC employees tend to report within the GMAEC. To avoid conflicts, it is recommended to make clearer the direction of reporting lines, type of information reported, and types of summary reports for higher level management. The project organization needs to be divided into three categories- design & planning, construction, and operations- each with its respective manager who resolves issues before higher management's involvement. The construction director needs to integrate the contract managers with project controls and technical services to gain a full view Phase I construction. Finally, issues which cannot be resolved at this level should be flagged to higher management.

Another issue, which could lead to conflicts, is that Siemens/Parsons Brinkerhoff (PB) lacks integration with the Tren Urbano Organization (TUO) management team. Also, Siemens/PB's role needs to be more clearly defined. It is recommended that design and schedule comments be integrated with TUO's as well as comments from the field inspection. Furthermore, important comments from the field could be summarized in a flag report for higher management in the TUO or be integrated by the construction manager first. Siemens/PB interface meetings could be integrated with contract manager's meetings. PB should also attend top management meetings. Siemens/PB is primarily acting in the PRHTA's interest and perhaps should act as an authority's representative together with the GMAEC.

A third issue is that field inspection comes from three directions: the contractors' own inspectors, PRHTA field representatives and Parsons Brinkerhoff (PB). This is a duplication of effort. Also, the contractors' own inspection teams are seen as unreliable, thus, PB and PRHTA are compensating. PB has the expertise and is responsible for quality, yet they cannot contractually direct the Alignment Section Contractors (ASC). PB needs increased authority to make field decisions by directly coordinating with PRHTA/GMAEC instead of reporting through Siemens. In addition, instead of the contractors' own inspectors, the PRHTA/GMAEC could act as the inspectors of all ASCs in a team, which would allow for more consistent inspection and

quality across the project. Also, to increase quality, the quality performance should be tied to contract payments.

Finally, the TUO needs to anticipate ASC delays. Even though STT must work with the ASCs for hand-overs, the PRHTA/GMAEC must ensure a plan for hand-overs is being developed. Also, there needs to be a plan for accountability of late hand-overs. The plan must include what will be done while accountability is being settled so the project does not become further delayed.

The above issues lead to potential conflicts. By better managing issues before they become major conflicts, a smoother and a more collaborative project should result. This research aims for a collaborative environment throughout the project and will provide data for further research in applying collaborative negotiations to Tren Urbano.

Summary of Issues for current results:

1. ISSUE: Micro-management limits efficiency.

RECOMMENDATION: Delegate authority to experienced people in positions defined by responsibilities.

(People should not define positions)

2. ISSUE: STT lacks part-owner role.

RECOMMENDATION: HTA/GMAEC needs to be integrated with STT into one organization under one roof where each department, for example design reviewers, should be integrated and share resources. This can ensure better cooperation and reduce redundancies.

3. ISSUE: Contractors will take lowest ceiling for quality under varying standards.

RECOMMENDATION: High quality standards must be set by top management and be aimed for by all. Standards must be consistent through all contracts and all contracts must be enforced strictly to this standard.

4. ISSUE: Everybody is responsible, thus nobody is.

RECOMMENDATION: There needs to be a single point of contact for top management in an integrated HTA/GMAEC/STT organization. There should be manager responsible for quality of design review, a manager responsible for an on-schedule and within budget construction, and one for operations and maintenance. Teamwork needs to be present throughout the organization including an integrated

inspection team consisting of HTA's, contractors', STT/PB, and any GMAEC field inspectors where the contract manager should be single point of contact the inspection team.

Work plan for remainder of project:

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| <i>Summer 1998</i> | Implementation plan for Tren Urbano in Puerto Rico. Follow up report and more detailed analysis with further recommendations. |
| <i>Fall 1998</i> | Further literature review and developing recommendations and model. |
| <i>Spring 1999</i> | Validating model and wrap |