

# THE CONSTRUCTION MANAGER-GENERAL CONTRACTOR METHOD FOR CONSTRUCTION OF TRANSPORTATION PROJECTS IN PUERTO RICO



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## Abstract

The Transportation infrastructure always needs investment. Fiscal problems at government require the use of innovative solutions to optimize the use of public funds. The traditional contract method, currently used, increases risks and loss of money. The CM/GC contract method reduces the risks during construction, which enhances project designs. This innovative contracting method, have good result in other states. The CM/GC was promoted, their implementation was discussed and future projects were identified. If PRHTA makes changes in their code of regulation and obtains the local industry support with a transparent selection method, the CM/GC can be implemented in Puerto Rico with success.

## Introduction

Puerto Rico's economy has been going through an economical recession over the past eight years, creating a big deficit that has affected the entire government system and its agencies. One of those agencies is the Puerto Rico Highway and Transportation Authority (PRHTA), with around \$277 million in deficit. The PRHTA is in charge of a great part of the transportation infrastructure. Components of this infrastructure, many of which are over 50 years old, are in the need of updates and maintenance. However, this entity is receiving over \$125 million annually from the Federal Highway Administration (FHWA) in order to invest in transportation infrastructure. The FHWA, through the "Every Day Counts (EDC)" program, promotes innovations with new constructions and contract methods. Therefore, PRHTA could optimize the uses of these federal funds with innovative initiatives. These actions will promote the economic development and the improvement of the roads and the highway system around the island. One new construction contract method promoted by EDC is the **Construction Manager General Contractor (CM/GC)**

## Objectives

- The General objectives of this project were:
- To promote the necessary changes in PRHTA to perform new alternatives of contracting.
  - To optimize the use of federal funds allocating for roads, while reducing risks.
  - To present reliable information in order to identify projects where PRHTA can apply this construction management method.
  - To set the bases to develop a Standard Operations Procedures (SOP).

## What is CM/GC?

The CMGC "is a project delivery method in which the agency contracts separately with a designer and a construction manager. The agency can perform a design or will contract with an engineering firm to provide a facility design. The agency selects a construction manager to perform the construction management services and construction works. The significant characteristic of this delivery method is the contract between an agency and a construction manager who will be in charge of the final cost and the construction deadline. The Construction Industry/Contractor input into the design development and constructability of complex and innovative projects are the major reasons an agency would select the CMGC method" [1]. The Figure 1 shows a graphically the CM/GC with PRHTA as owner:

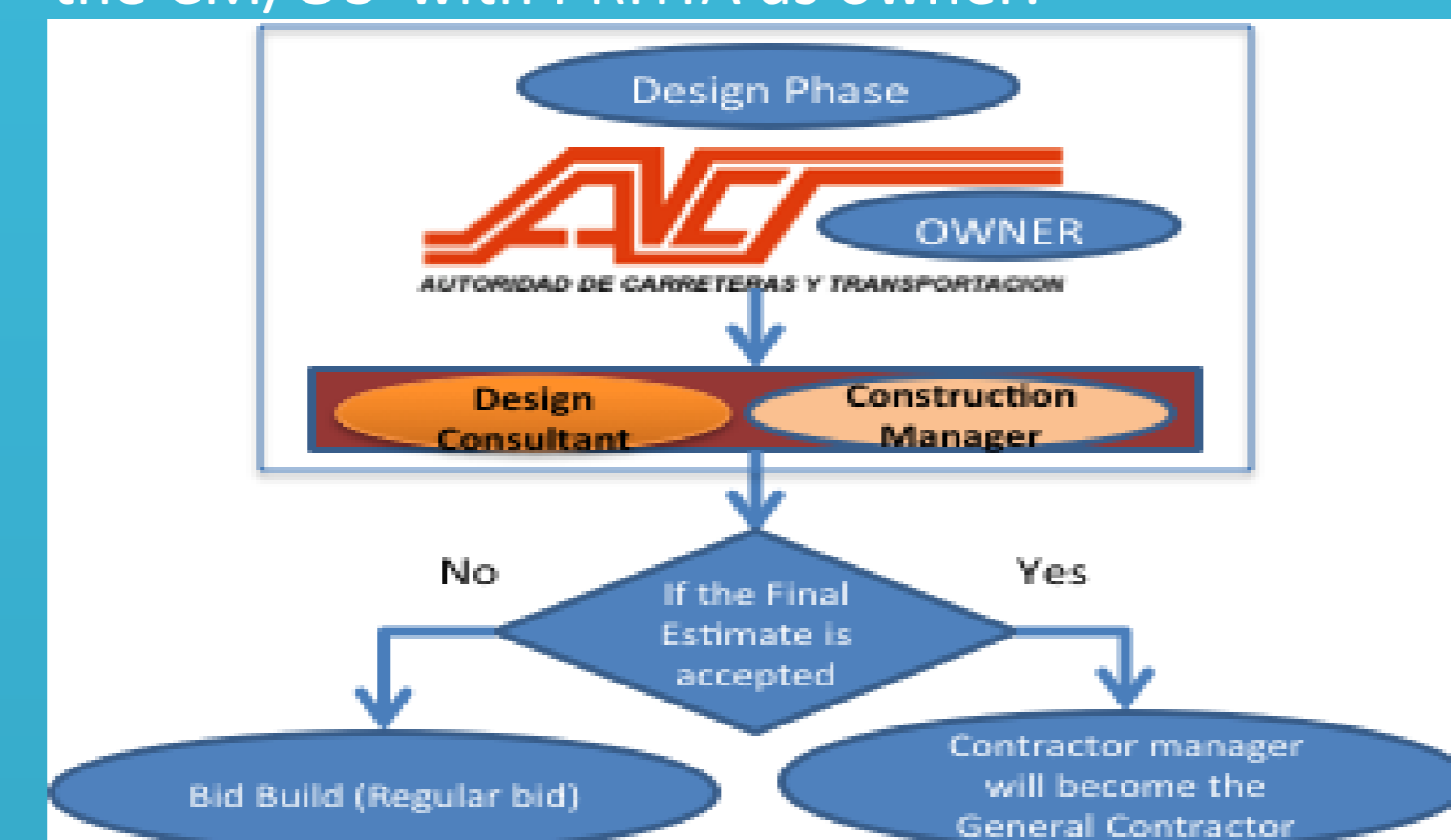


Figure 1: CM/GC contract method

## What are the results in others States?

The CM/GC produces savings in the construction cost because the risks are reduced. "CMGC produces its greatest savings through innovations that address risks—particularly risks associated with the duration of the construction" [2]. Over 20 projects were constructed with CM/GC through the Nation. Utah is the state with most experience in the use of this innovative contract method. These projects create savings in time and costs. Currently 13 States have enabling legislation for CM/GC. These states are:

- California
- Nevada
- Oregon
- Washington
- Idaho
- Utah
- Colorado
- Arizona
- Texas
- Florida
- Minnesota
- Michigan
- Connecticut

The CM/GC projects motivate the innovation during the construction. The following information, resume some goals achieved on several projects:

- The Replacement of 7 structures along I-80. This project produced over \$2,000,000 in savings in the construction stage. The use of new technologies and an enhanced design, where the CM/GC team managed the utilities and prioritize the MOT plan, and achieved the most important goal: the accelerated delivery of this project. The project was completed in 2 years. The Figure 2 show the use of technologies like Self-propelled modular transporter (SPTs).



The Figure 2: Self-propelled modular transporter (SPTs). [3]

## ANALYSIS

To implement the CM/GC in Puerto Rico, it is necessary to research the current situation of the PRHTA. Currently, PRHTA is constructing projects with the traditional contracting method of Design Bid Build (DBB). The growing need of projects in the urban areas and the lack of personnel on PRHTA increase the risks in many constructions areas.

Current delays with the PRHTA projects caused economic losses to its users and businesses. Some projects were identified as a good prospectus to use CM/GC contract method was:

- The PR-18 Reconstruction.** The project consists in "the rehabilitation or replacement of 5 bridges and the pavement. The major risk of this reconstruction is the traffic volume. Over 289,000 vehicles use this route and it provides access to important stakeholders such as Centro Medico Hospital, Plaza Las Americas Mall, and many others" [4]. Other risks include the MOT, and the drainage system. Additional potential projects are:
- PR-3 Pavement Reconstruction:** The PR-3 or "65 de Fantería Avenue" is good candidate for CM/GC. The major risks are the businesses in the area, plus the utilities management and the MOT.
- Bridge Emergency Replacement:** Currently PRHTA has many small bridges that could represent the opportunity to practice the CM/GC projects.

## Results

The process of selection should begin with a committee composed with the Top Managers of PRHTA, and offices directives like construction and design. They should select a design in house or a design RFP project. The project selected should have many risks during the construction phase. This committee should establish the goal of the project selected. "The goals should be generally based on the following:

- Quality
- Scope
- Budget
- Schedule
- Impacts to the public"[5]

Another committee in Utah known as the Oversight Committee should decide the Items that have more risks, and public the RFPs to auction. A third committee will score the proposals by cost and construction methods presented by the contractors. The scores rules should be decided by PRHTA. Then with the score completed by the technical committee, the proposal should go back to oversight committee. In this stage, the RFP will be selected only by scoring without the contractor's name. This type of auction can be performed on PRHTA under the Article VIII of PRHTA Code of Regulations. Shown in Figure 3 is the proposed implementation flowchart.

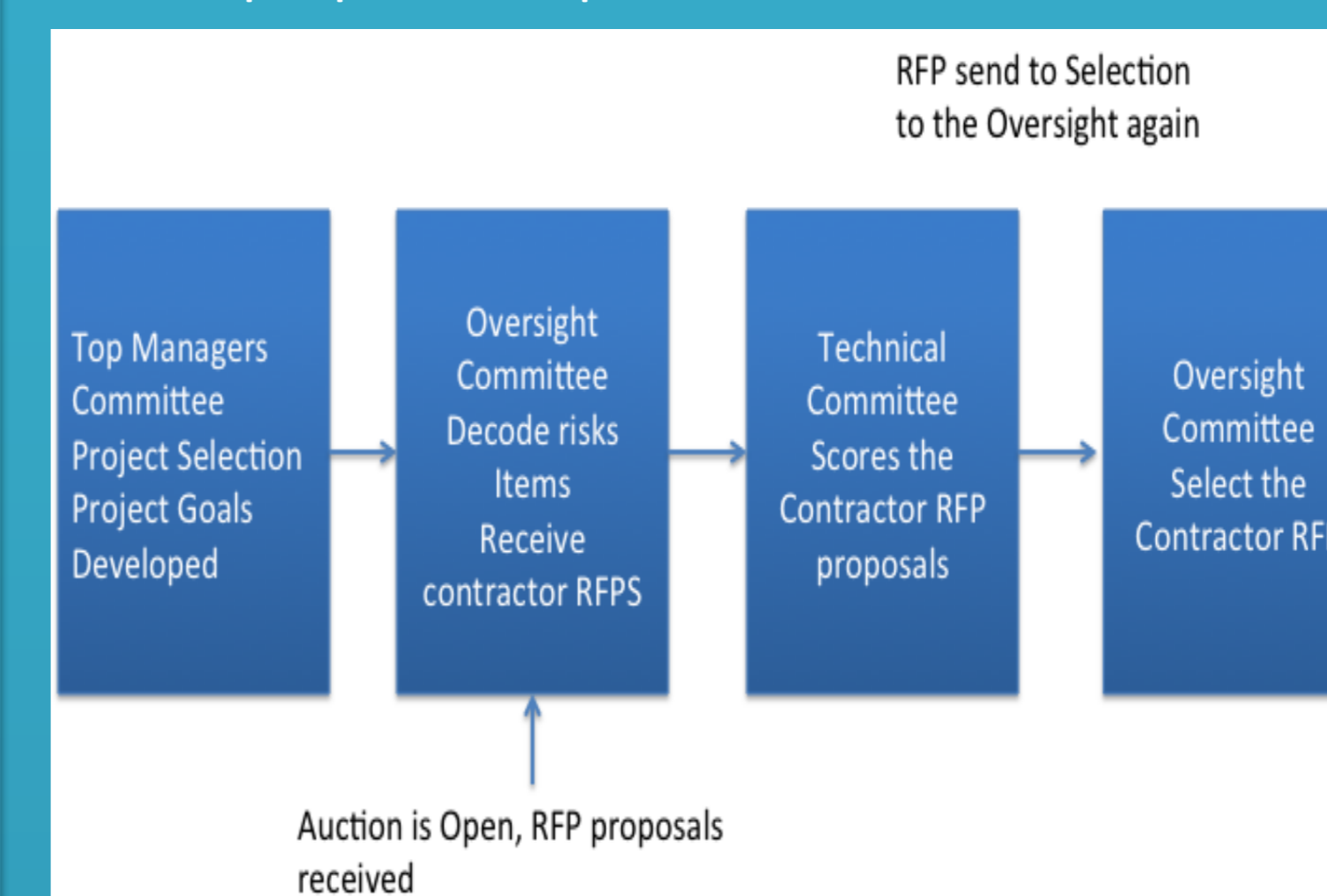


Figure 3: Proposed implementation flowchart

The CM/GC can be a good alternative; especially with the projects with more risks. "Is a good option on certain transportation projects, where unique challenges call for special qualifications and extraordinary contractor cooperation for the project success of the project" [6]. The CM/GC has many benefits for PRHTA. The following list of benefits is the result of projects in the state with more experience with CM/GC, Utah.

- Reduces risks:** The use of CM/GC reduces the risks to the owner and the contractor, because the integration of designer and the contractor, make the design more accurate and realistic. In Figure 4 the risks sharing by contract construction methods [3]

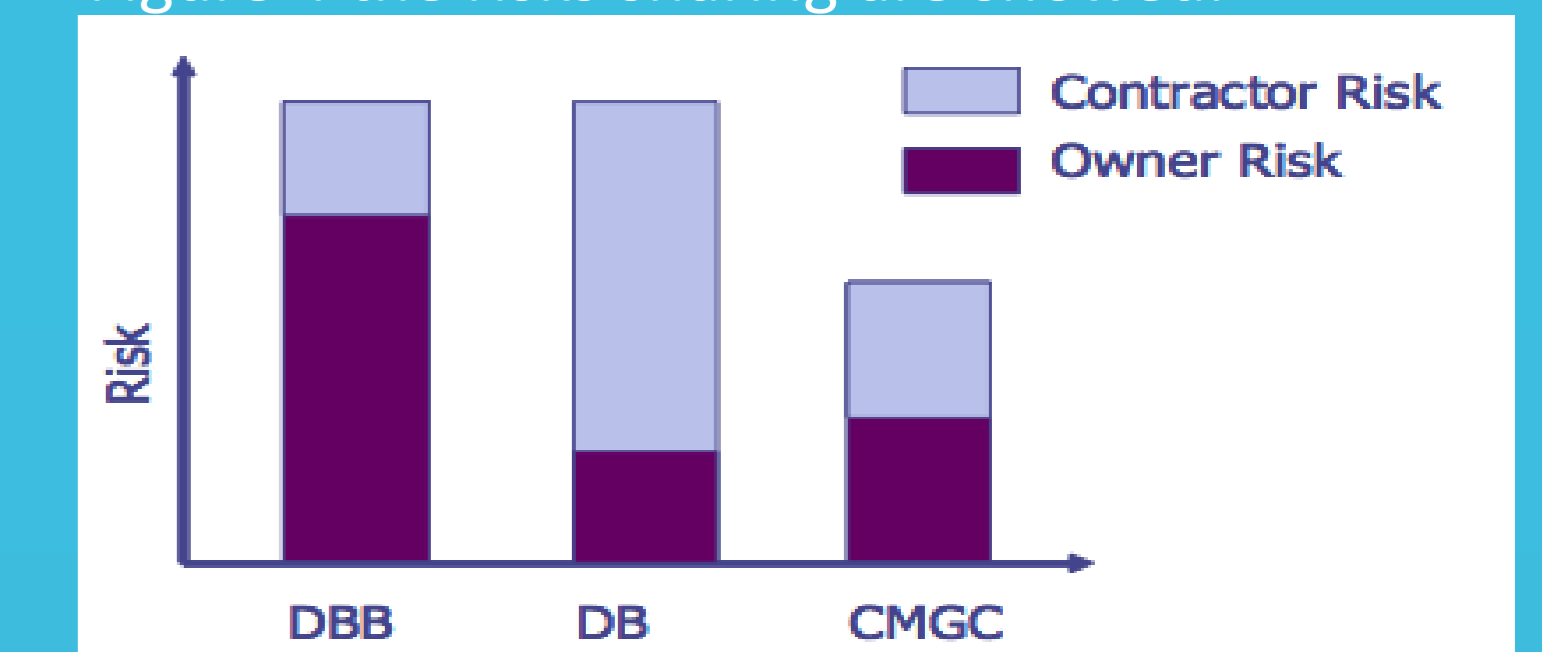


Figure 4: Risk sharing by contract construction methods [3]

- Reduction in time of project delivery:** The traditional contract method produces many delays with the federally financed projects in Puerto Rico.
- Application of innovations:** The construction projects especially in these times need to be innovative. The use of new technologies could be more risk and many states and construction companies do not invest in these innovations. The CM/GC method helps in the use of innovating alternatives.
- Cost Reduction:** Puerto Rico needs a reduction in the cost of construction projects. Some projects in Utah experiment a cost reduction of 40%.

## Conclusion

The new contracting method of CM/GC was promoted and a committee was created to analyze the implementation the future implementation of this contract method. Also the projects that can be performed with CM/GC were identified. The meetings and discussion performed set the bases to develop a Standard of Procedures (SOP). This SOP began with the discussion and will continue in future meetings. If PRHTA completes this process, the agency will optimize the use of federal funds. The optimization of funds mean, more money to improve and reconstruct the transportation infrastructure. Finally, the presentation of reliable information and successful examples, like the CM/GC projects in other states, creates more confidence on PRHTA and the some projects were identified to use CM/GC.

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