# CM-at-Risk Delivery System And The Miami Intermodal Center

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## Abstract

The Miami Intermodal Center (MIC) is the first "CM (construction manager)-at-risk" project ever funded by the U.S. Federal Highway Administration (FHWA). The size of the project qualifies it for "mega-project" status, but this is not the only thing that makes this an historic project.

MIC, a $2.25 billion project located just east of Miami-Dade International Airport (MIA), is envisioned as a consolidated transfer center for passengers using the airport, intercity and commuter trains, rapid transit, local and intercity buses, and cruise ships in the Port of Miami. The project is being developed by the Florida Department of Transportation (FDOT) and the Miami-Dade Aviation Department, in cooperation with the Miami-Dade Expressway Authority, Miami-Dade Transit, Amtrak, and various rental car agencies serving the airport. The MIC is actually a series of projects, including a consolidated rental car facility, a people-mover connection to the airport, and a number of road access improvements around the airport.

What really makes this project unique, however, is the delivery system chosen by the owners for the early stages of the project. All manner of fast-track construction methods have been used in building construction and industrial construction for years, but these are a relatively recent development in the area of civil, or heavy, construction. FDOT had its first design-build (DB) projects in the early 1990's, with the FHWA beginning to fund DB projects in the state later in the decade. For the MIC, however, the CM-at-risk delivery method was chosen. Very similar to the "Team Approach" taught in construction management textbooks, the CM-at-risk approach is a cost-plus-fee contract with a guaranteed maximum price (GMP). The GMP is based on the sum of the CM's fee, the CM's contingency, the money set aside for General Conditions construction, all the subcontracts, plus an estimate for unbid subcontracts. The CM agrees to pay for costs that exceed the GMP and are not a result of changes in the contract documents.

**Keywords:** Miami Intermodal Center, CM-at-risk, delivery system, access facility, terminal access roads, MIC/MIA, tri-rail

# 1. Introduction

The Miami Intermodal Center (MIC) is a world-class mega-project that has drawn intense interest and scrutiny from construction and design engineers both nationally and internationally. It combines the latest in horizontal construction, vertical construction, and project delivery methods. The project scope also includes innovations in project financing and engineering that will be noted, but not discussed at length as they are beyond the scope of this paper.

As early as 1989, the Miami International Airport Area Transportation Study recommendation for the implementation of a multi-modal transportation access facility to help mitigate the growing traffic problem in and around the airport was accepted by Miami-Dade County. However, due to lack of funding and other issues, the project was not started until 2003. MIC will be a world-class multi-modal facility that is estimated to take 15 to 20 years to construct and cost approximately $2.25 billion.

MIC includes the first transportation project using the "CM-at-Risk" (CMAR) delivery system ever to receive federal funding. All of the work currently scheduled using the CMAR system is slated for Phase I of the project, which is now in progress and is estimated to take five years and cost $1.35 billion. The work done using the CMAR delivery system includes the rental car facility (RCF), the MIC terminal access roads, and other items, and is estimated to cost $230 to $250 million and be completed in 2007.

This paper provides an overview of the project, how CMAR works, and how it is performing when compared to traditional project delivery systems.

## 1.1 Background

The project sponsor was FDOT, and because of its size and significance, the project was classified as a "mega-project" by the United States Department of Transportation (US DOT). FDOT would act as the "owner" of the project even though Federal Highway Administration (FHWA), Miami International Airport (MIA), Miami–Dade County, and the Federal Aviation Administration (FAA) had a vested interest in the project and could also be considered owners. Once the decision was made to build the project, a consultant, Earth Tech, was quickly added to the team by FDOT as the Program Manager.

Several decisions lay before the team. A designer had to be procured, as did construction engineering and inspection (CEI) services and construction services. A delivery system had to be chosen and numerous permits obtained. The proposed facility had to accommodate the rental car companies around the airport, the Tri-rail system (an above-ground train line that connects the three major south Florida counties—Dade, Broward, and Palm Beach—and ends at MIA), the Miami-Dade County Transit Authority (bus lines), Amtrak, cruiseline courtesy buses, hotel courtesy buses, Greyhound buses, the existing street and highway system, and numerous other transportation entities.

One of the most daunting tasks facing the team was trying to please the numerous parties of interest that ranged from the other involved agencies, such the FAA and Miami-Dade County, to private interests, such as the Tri-rail system and the car rental companies that would use the new facility. In addition, any decision regarding the delivery system had to be filtered through FDOT's long-standing policy that any prime contractor must self-perform at least 50% of the project.

# 2. The Project

The transportation development portion of the project was separated into two phases. Phase I will include all right-of-way acquisition, access improvements (roadways), the consolidated rental car facility (RCF), the MIA Mover (formerly referred to as the MIC / MIA Connector, this is a two-mile bridge on which either trains or trams will transport passengers between the MIC and the MIA), and the MIC Core (Phase I). Actually, only $80 million of the approximately $400 million cost of the MIA Mover will come from MIC funds, as the MIA Mover is primarily sponsored by the county and MIA. [1] Phase II, not scheduled to commence until at least 2007, will include completing the MIC Core, constructing platforms serving elevated Tri-rail, Amtrack, and Metrorail lines, and all construction of MIA landside facilities.

## 2.1 Phase I

While the entire program will be completed over the next 15-20 years, the first phase is scheduled to be completed over a five-year period of time at a cost of approximately $1.35 billion. This Five Year Program will consist of the activities and corresponding costs shown in Table 1.

*Table 1. MIC Cost Breakdown by Activity Type*

| Amount | Activity |
|---|---|
| $ 615,000,000 | Construction |
| $ 350,000,000 | ROW and Environmental Remediation |
| $ 22,000,000 | PD&E Study |
| $ 84,000,000 | Design |
| $ 42,500,000 | Program Management |
| $ 32,000,000 | CE&I Costs |
| $ 93,000,000 | Contingency |
| $ 65,000,000 | Financing |
| $1,303,500,000 | Total |

### 2.1.1 Rental Car Facility

The RCF is the first major component of the MIC being constructed. It will co-locate the rental car companies currently located at the airport and many of the companies located adjacent to the airport. The financial impetus for the early commencement of the RCF was a loan from the Transportation Infrastructure Funding Innovation Finance Act (TIFIA). "The RCF is currently budgeted in the MIC work program at $218.7 million; however, a $190 million scope has been

agreed to by all parties and an updated financial plan is currently being reviewed by the joint TIFIA Office. When the RCF TIFIA loan is finalized, the work program estimate will be conformed to the project budget. TIFIA loan draws are occurring more slowly than originally forecast and lower TIFIA loan balances are anticipated for eventual repayment." [2] Details of the TIFIA loan are discussed later in this paper.

The sheer size of the building (1400 feet by 1200 feet, with the top floor sixty feet off the ground) makes construction a challenge; however, the size of the building was not the main consideration. Each floor of the building will house a fuel distribution center where gasoline will be pumped into the rental cars at each level. This is the first time that any building in the United States has had elevated fuel distribution capability; special permits and numerous considerations will be required.

The RCF will include:

- Ready/return vehicle capacity of approximately 6500 vehicles
- Fleet storage capacity (vehicles not in use) of approximately 3500 vehicles
- Quick turnaround vehicle fueling and washing facilities
- Spacious customer service facilities for rental car transactions

The most interesting part of the construction of the RCF, and probably the whole project, will be the construction of the elevated fueling centers. The Senior Program Director for the project said that for the period of time that this portion of the RCF is being constructed, "the Fire Marshall will be running the project." [3] This unique construction will be a subject of widespread interest.

### 2.1.2 MIC Core (Phase I)

The first phase of the MIC Core will cost approximately $80 million and accommodate the bus depot, Tri-rail passenger parking, and MIA Mover Station. The MIA Mover Station will be built adjacent to the RCF. This facility will allow passengers of Tri-rail, city busses, and rental cars to board the MIA Mover, and be transported to the airport terminal. The MIA Mover will feature large cars that run on either electric rails or rubber tires and will be boarded on the top floor of the building, 60 feet off the ground. This facility is expected to be completed and operational by November, 2008.

## 2.2 Phase II

The transportation development portion of Phase II will consist of completing the MIC Core, constructing platforms serving elevated Tri-rail, Amtrack, and Metrorail lines, and all construction of MIA landside facilities. There is also a commercial development portion of the MIC that will be completed as part of Phase II per the Joint Development Agreement.

### 2.2.1 Joint Development Agreement

The Joint Development Agreement was first conceived as a revenue-producing program and comprises the commercial development portion of the MIC. An oversight committee was formed to supervise the commercial development, and they retained ERA, a D.C.-based consultant, to perform a study that found that the area in and around MIA was in need of office towers, parking, ancillary retail, and a hotel/conference center.

In early 2002, an RFP was advertised for a developer to handle the commercial development, and the apparent choice is MIC Development, LLC, a joint venture consisting of equity partners The Codina Group and Mallory & Evans, hotel developer The Continental Company, marketing giant Market Place Development, and two large AE firms. Negotiations have begun with this group, with the expected start date on commercial development set for early 2008.

The commercial part of the venture will include office towers, a world-class conference hotel, restaurants, and other businesses. The plans now call for FDOT to lease space to occupants, raising over $5 million per year to help pay the debt incurred through the loans part of the project financing. Appraisals are already being done to estimate the current market value so lease and rental terms can be developed.

A stipulation in the agreement states that if rents exceed $5million in any year, the amount of revenue over $5million will not go to pay down the debt, but must be used to pay for road and bridge construction.

## 3. Economic Impact

The construction of MIC will result in numerous temporary and permanent job creations within many sectors of the economy, especially construction, retail, and service. It is estimated that over the 15 to 20 years of the entire construction process, 76,000 construction and construction-related jobs will be generated, and 22,000 permanent jobs will be created to operate the facility once it is constructed. The economy and standard of living around MIA will be enhanced because the facility will encourage travelers to use the various public transportation systems integrated into the MIC. It is estimated that by 2010, 75,000 passengers will use the MIC daily. Of these, approximately 45,000 are expected to be using the MIA Mover to travel to or from the airport. [4]

## 4. Project Funding

Financing the MIC, with a total cost estimated at over $2.25 billion, was a challenge for the state of Florida and Miami-Dade County. Phase I is projected to cost approximately $1.35 billion over five years and has received funding from a variety of sources. While obtaining the TIFIA award brought significant funding, as well as international notoriety to the MIC project, it was certainly not the only significant source of funding. For Phase I, the MIC has received nearly $165 million in Federal Highway Administration (FHWA) grants, $386 million in state

(FDOT ) funds, and a $25 million Florida State Infrastructure Bank (SIB) loan. The Miami-Dade Expressway Authority has provided $87 million in toll-backed funding, and the project has also received $18 million from Florida's SIB specifically for a portion of the project, the SR 836/SR 112 connector. The Miami-Dade Aviation Department will fund most of the $400 million cost of the MIA Mover with airport user fees.

The complete list of funding sources and their contribution can be seen in Table 2. [2]

*Table 2. Funding Sources for MIC, Phase I*

| **Source** | **Contribution ($Millions)** |
|---|---|
| Prior and future Allocations of State and Federal Funds in Miami-Dade County's Transportation Improvement Plan (TIP), Long Range TIP, and Other State Funding | $249 |
| MIA Capital Improvement Plan | $400 |
| RCF Customer Facility Charge | $25 |
| Miami-Dade Expressway Authority's Capital Program | $86 |
| Miami-Dade County | $30 |
| Ancillary Revenues for from Concessions and Joint Development | $37 |
| FDOT State Infrastructure Bank Loan | $25 |
| TIFIA Loan | $433 |
| Capitalized Interest and Finance Costs | $64 |
| Total | $1,349 |

Because of the close economic and geographic ties between MIC and MIA, the events of September 11, 2001 led to a reevaluation of the MIC program which focused on funding and timing. MIA has been much slower to recover from the aftershock of the September 11 disasters than most of the nation's airports due to MIA's dependency on passenger traffic from Latin America and the recent effects of low-cost air carriers operating through neighboring Ft. Lauderdale. The project elements most impacted by events since September 11, 2001 are:

- The MIA Mover
- The RCF
- Resultant program schedule adjustments for a delay of 18-30 months.

## 5. Delivery System

Three delivery systems were given strong consideration for each aspect of Phase I; the result was that different portions of ongoing work are being handled in different ways. Since federal funding was sought for each activity, FHWA approval was required for each delivery system decision. It was decided that portions of the work would be handled in the traditional FDOT way, which is by the linear method, or Design-Bid-Build (DBB). Other portions of the project would be handled by the Design-Build (DB) method.

FHWA had long allowed FDOT to use the DBB method for federally funded projects. FDOT has received federal funding to use the DB method for almost ten years, developing a high level of comfort within FHWA for use of that method in Florida. For the RCF and the MIA Mover

Station, however, a level of vertical construction expertise was needed that FDOT projects do not typically require.

But since the project also contains quantities of earthwork and site preparation common to FDOT projects, and roads and bridges are called for in the project, a delivery system was needed that would best meet the challenge of both linear and vertical construction.

In July, 2000, Earth Tech performed a technical evaluation of three delivery systems as a means for the design and construction of the RCF and certain other related structures. The three systems considered were DBB, DB, and Construction Manager-at-Risk, or "CM-at-Risk" (CMAR). It was decided that this portion of work, amounting to approximately $230 to $250 million, would be let under separate contract, using the CMAR delivery system. Reasons given by Earth Tech for this choice were that CMAR offered the following :

- Design process control
- Ability to meet or exceed schedule requirements
- Highly qualified contractor
- Highly qualified designer
- Budget/Cost control
- Project team formation
- Constructability input from the CM

This choice in delivery systems meant that FDOT had to waive, for this project, their long-standing rule that all prime contractors had to self-perform at least 50% of project work. In addition, in order to receive federal funding, FDOT had to make a special application to FHWA under Special Experimental Project Number 14 (SEP-14). SEP-14 is a program by which FHWA can fund a limited number of projects that don't follow existing FHWA guidelines, provided the projects include innovative construction practices or delivery systems. Until fairly recently, a DB project had to go through this process, but after several successful DB projects, the FHWA stopped requiring this special application for DB projects. The MIC is the first CMAR project ever funded under SEP-14.

## 5.1 CM-at-Risk

Clough and Sears state in their well-known textbook that, "An appreciable share of the private construction market is now being done using the 'team approach.' When this procedure is followed, the private owner selects the architect and building contractor as soon as the project has been conceived. The three parties now constitute a team that serves to achieve budgeting, cost control, time scheduling, and project design in a cooperative manner." [5]

Using the "team approach," the owner assembles the project's key players, such as the designer(s) and contractor(s), to study the proposed project. The team determines the project scope and budget, and the designer develops preliminary drawings from which the contractor makes conceptual cost estimates. As the process continues, the designer prepares the final drawings and specifications, and the owner makes the necessary financial arrangements. After financial commitments and required permits are obtained, actual construction begins. The

designer and the contractor work closely together, modifying the design and the drawings as may be required. The process offers the owner the advantages of time savings, cost control, and improved quality. [5]

The method chosen to facilitate fast-track construction of the MIC, "CM-at-Risk," is very similar to this textbook description of the "team approach" and can be viewed as an adaptation of this established building construction delivery system used in private industry to civil or heavy construction in a public forum. The CMAR contract is a cost-plus-a-fee contract with a guaranteed maximum price (GMP). The GMP is based on the sum of the CM's fee, the CM's contingency, the "general conditions construction," all of the subcontracts, and an estimate for unbid subcontracts. The CM agrees to pay for costs exceeding the GMP that are not a result of changes in the contract documents.

CMAR theoretically reduces the amount of risk for every entity involved in the project. From the beginning, the client's (owner's) understanding of project requirements is combined with the wisdom, experience, and technical expertise of architect-engineer (AE) and CM firms. This team has control over every aspect of the project, and together they provide an absolute directive for design, construction, and functional requirements. One of the most important benefits is that the arrangement fosters a non-adversarial relationship that furthers collaboration in decision making. The CM can review the drawings beforehand and catch errors, reducing the owner's risk, while the AE similarly reviews the CM's approach to the work, providing constructive recommendations.

The CM is allowed to take bids or proposals from subcontractors after entering the contract and prior to submission of the GMP, which reasonably reduces the CM's risk. The procedure is more methodical and more predictable than the low-bid DBB and affords the owner more control over design than the DB system. This is because the AE is under contract to the owner under CMAR instead of being part of a joint venture under contract to the owner and tied to the contractor, as is the case under DB. The lack of a tie between the designer and the contractor reduces the owner's risk, and in reality, these factors reduce risk for all parties.

There is a contingency within the GMP to cover unexpected but justifiable costs, and a contingency above the GMP allows for owner changes. As long as the subcontracts are within the GMP, they are reimbursed to the CM, so the CM represents the owner in negotiating any changes with subcontractors.

## 5.2 CM-at-Risk at MIC

The MIC can be seen as a pilot project for CMAR from the FHWA standpoint because it is their first such project. It is also FDOT's first CMAR project but is not the first for the state of Florida. The Florida Department of Management Services (DMS) has built several vertical projects using the method over the last 15 years. For this reason, DMS had personnel on the original Technical Review Committee and originally had a financial stake in the project because

the CMAR contract was forged using DMS procedures. Immediately after the contracts were signed, DMS assigned all their rights to FDOT.

A negotiated fixed fee is the method of CM compensation on the MIC project. The CMs interested in this project had to submit a GMP for administering this fast-track construction project. The chosen CM is required to prequalify all subcontractors and oversee the bidding of all trades contracts. In this way, all construction work would be competitively bid. The only way that the CM could self-perform any construction would be to outbid the subcontractors on a portion of the work.

The CM is paid a management fee plus expenses for oversight and coordination of the construction process. This could include project close-out, systems start-up, as-built drawings, operations and maintenance procedures, and warranty services. The CEI consultant, Earth Tech, performs the QA verification testing, as well as the Threshold Inspection of the building (permit work). The FDOT District Materials Laboratory performs Independent Assurance and Independent Verification testing. The CM, then, is left to perform all QC and Value Engineering (VE) for the project; any savings realized by any VE change proposal is split, with 70% going to FDOT and 30% going to the CM. Earth Tech was awarded the CEI work under a separate contract from the one for their Program Manager duties.

Another contract provision allows the CM to keep 30% of the difference between the GMP and the actual cost of construction. Described by the program manager as "a double-edged sword," this gives the CM an incentive to keep costs as low as possible, but also presents the CM with the motivation to set the GMP as high as possible. [3]

On January 29, 2001, a legal notice advertisement requesting Statements of Qualification for a CM for this project was posted. Technical Proposals were submitted by the short-listed CMs on May 1, 2001, oral presentations were heard by the Selection Committee on May 24, 2001 and Turner Construction Company was chosen as CM for the project. Delays occurred in getting the project started due to the World Trade Center and Pentagon disasters of September 11, 2001, and when the runner-up for the CM assignment protested the selection of Turner.

After the selection process, FDOT, DMS, and Turner Construction, Inc., signed a contract on March 1, 2003. The GMP No. 1 bid package was issued to Turner on April 4, 2003, and the notice to proceed came in mid-July, 2003. The Organizational Chart for the MIC project is seen in Figure 1.

Construction items were broken down into separate packages called "GMPs", each to be negotiated separately and each with its own Letter of Authorization (LOA). At this point, the GMP packages are as follows:

GMP I – RCF foundations and underground utilities. Cost: $17.6 million.
GMP II – MIC Terminal Access Roadways (MTAR), Transit Access Roadways (TAR), tunnels, LeJuene Blvd. water main. Estimated Cost: $21.0 million.

GMP III – Tri-rail Station, MIA Mover Guideway Foundation. Estimated Cost: $22.0 million.
GMP IV – MIA Mover Station (minus 4th-floor lobby), RCF Building and bridge. Estimated Cost: $185 million.

The fourth-floor lobby is not currently planned for completion under this project. This raises the possibility of a GMP V, or that the lobby may be constructed under a separate agreement. [6]

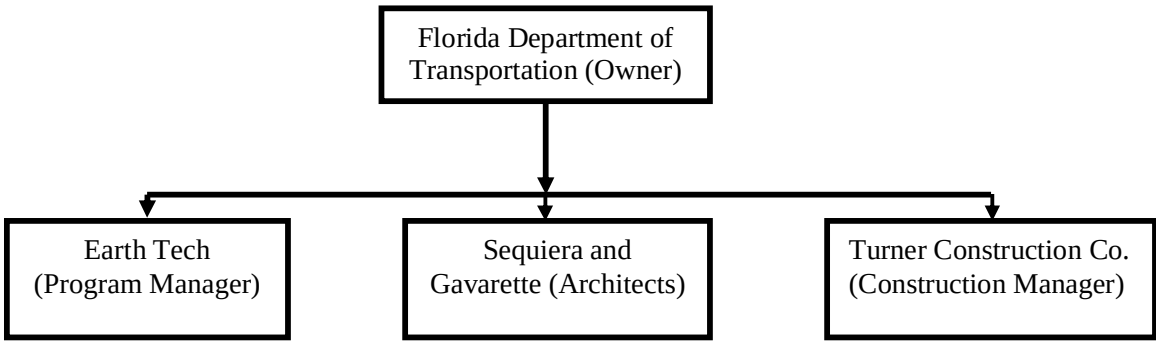


*Figure 1. Organizational Chart for CMAR Portion of the Miami Intermodal Center*

## 6. Project Progress

As of the time of this writing, GMP I was completed, GMP II was about 15% completed, Turner had been issued the LOA for GMP III, and the plans for GMP IV were at the 65% review stage. In getting to this point, the CM has overseen the driving of 2779 24-inch-by-24-inch pre-stressed portland cement concrete (PCC) piles, the construction of 672 pile caps, the placing of almost 15,000 cy of grout and approximately 11,500 cy of PCC. Also, over 120,000 cy of fill dirt has been delivered, spread, and compacted and 5000 linear feet of utility lines have been relocated.

Land acquisition and environmental remediation for Phase I and Phase II of the project have been completed. The RCF foundation has been completely constructed, and major roadway projects are under contract. MIA and Miami-Dade County are proceeding toward the procurement of an entity to perform a design-build-maintain for the MIA Mover utilizing advance funds from the county. Customer facility charges have been collected from planned users of the RCF since May, 2004.

## 7. System Evaluation

Theoretically, the CMAR delivery system brings a wide variety of advantages to a construction project; however, there are important elements that must be in place if CMAR is to bring all of its potential benefits to the project. Two of these essential elements are: 1) The CM must be on

board no later than the 35% plans review, and 2) There must be a designer that works especially quickly and efficiently between the 65% plans review and plans completion.

If the CM is not on board by the 35% plans review, then the construction expertise that is so much a part of the CMAR design phase will be lost. In addition, if the designer does not move quickly from the 65% plans review to plans completion, the fast-track advantage will be lost because the CM cannot obtain many of the required permits without completed plans.

Unfortunately, Turner was not brought on board for GMP I until the plans were completed; therefore, there was not the level of constructability review that CMAR is known for. In addition, the project was delayed by the unexpected length of time required for TIFIA loan funds to arrive and was perilously close to being severely delayed by permit acquisition. In both cases, FDOT and the rest of the project team were fortunate. Although 50 change orders were executed in GMP I, resulting in a net cost increase of approximately $600,000, very few of them could have been avoided by a proper constructability review. As for the permits, the project team was again fortunate. The county allowed the RCF to be built under the old (2000) South Florida Building Code instead of insisting it be built under the new (2002), more demanding and time-consuming Florida Building Code, which saved time and outlay equaling at least $5 million. Project personnel estimate that had the authorities not allowed the project to be "grandfathered" into the old building code, the additional delay would have been at least a year. (MIC Personnel 2004)

Another big advantage of CMAR is that, theoretically, there should be a better relationship between the parties to the contract than under the DBB system. While all agreed that this was the case during GMP I, it is apparent that not having the CM on board until plans completion caused things to occur on the project that strained relations to some extent. For example, the CM was forced to act more like a prime contractor than a CM in some of the dealings with the subcontractors because of constructability issues and other questions that could have been solved proactively instead of reactively had the CM been on the team from the beginning. There were also issues between the program manager and the CM early in the process of GMP I that could have been avoided by having the whole team in place from the beginning.

Even with the CM coming on board late in GMP I, the evaluation of the system by the participants was positive overall. Project personnel reported a "great" relationship between the CM and their subcontractors and that there was much less of an adversarial relationship between all parties to the contract than has been experienced under the DBB system.

The difference between working on a project under the DBB system and under the CMAR system was described by one individual on the project as "two different planets. Under the DBB (low-bid) system, all of your profit is made on project changes. Contractor or CM personnel are trained to find potential changes. With CMAR, the CM is responsible for the whole job and the approach to the project is different. The CM under CMAR is much more service-oriented than a CM or prime contractor under DBB. In fact, when this company hires someone out of the DBB environment, it takes an individual about two years to convert from the

adversarial attitude bred by the DBB delivery system to the more service-oriented attitude prevalent in the CMAR delivery system." [3]

Other experiences and insights shared by those involved with the project include:

- The key element in the CMAR system on this project is the contingency fund (10% on this project). Without that, an adversarial atmosphere would appear on the project.
- Instead of the prime contractor or the CM looking for changes as on a DBB project, the subcontractors are doing so, but a strong CM insulates the owner from this problem.
- There was freedom to attract a blue chip contractor (CM), not the low bidder.
- There was much more flexibility and ability to handle the unexpected.
- There was freedom to attract a blue chip designer and pair them with the contractor.
- Much greater ability to handle things that the owner and CM are not familiar with, such as the elevated fueling facilities. [3]

For GMP II, the CM was brought in a little earlier than in GMP I; however, it was not early enough. Turner was brought in only a little before the plans for GMP II were completed but was able to influence the design via the VE process even though they were unable to help at all with the constructability review function. In short, in GMP II, Turner has been more involved in the design than in GMP I but still not fully utilized.

Turner was on board by the 35% plans review for GMPs III and IV. In fact, as of this writing, Turner had just received the 65% plans from which they will calculate and submit a GMP. The intent of CMAR as it is now being administered at MIC is for the CM to assume liability at the 65% plans review, but they have 60 days from receipt of the 65% plans to submit their guaranteed maximum price for any GMP, in this case, IV.

# 8. Summary and Conclusions

"MIC is a model for infrastructure development and implementation with partners including FDOT, Miami-Dade County (transit, aviation, expressway authority and seaport), US DOT (transit, highways, aviation, and Coast Guard), and various" companies from the private sector. Federal, state, county, and private funding sources are being utilized.

A TIFIA loan has played a critical role in the overall financial structure of the MIC program. It has allowed the parties to commence the project in the most efficient and timely manner and winning TIFIA loan approval won world-wide recognition for MIC.

Although the CM was not involved as early as needed in GMPs I and II, the CMAR system has still performed admirably. The adversarial relationship between owner and CM or prime contractor under the DBB system was greatly reduced even in this incomplete execution of the system. Many of the other advantages credited to the CMAR system were also apparent in the execution of GMP I and, so far, GMP II. Among these are:

- With CM-at-Risk, FDOT has complete freedom to select a design firm completely on the merits of its expertise, reputation, and concept of the project. Similarly, for the

construction work, it provides an opportunity to select a contactor with the expertise needed for a particular project and an excellent track record of completing projects on time and within budget.

- Instead of the prime contractor or the CM looking for changes to increase profits, the subcontractors are doing so, but a strong CM insulates the owner from this problem.
- There is a high degree of flexibility and ability to handle the unexpected
- The owner has much more control over the design process than is possible under the DB system

For GMP II, the design was also almost at 100% when the CM was retained; thus, no constructability reviews were provided by Turner. This time, however, Turner did make some contribution to the pre-construction phase by providing VE for some portions of the work.

GMPs III and IV will be more true to the theoretical CMAR because Turner is thoroughly involved in the design and construction activities with input from the beginning through constructability reviews and VE. GMPs. III and IV will, then, provide a more complete case study of the delivery system than the first two GMPs.

Much of the credit for the flexibility and service orientation of the CM and subcontractors was directed at the contingency fund (10% on this project). Without that, it was feared that an adversarial relationship would manifest itself on the project.

FDOT is very pleased, at this point, with its decision to use the CMAR delivery system, and the research team will continue to monitor the project to learn more about the application of this method to transportation construction.

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