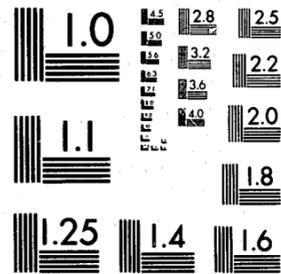


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## Florida Sets Example With Use of Concrete Modules

by Charles B. DeWitt

"We recognize that improved methods must be developed to reduce the excessive time and cost required for the construction of correctional facilities," said Louie L. Wainwright, Secretary of the Department of Corrections for the State of Florida.<sup>1</sup>

Faced with a court order to close a State prison facility at Raiford, officials of the

Florida Department of Corrections searched for a new method of construction that would reduce the time required for completion of a replacement facility. After careful study, they focused on an approach developed more than 150 miles away in the Tampa Bay area, a technique that uses prefabricated concrete cell modules. Use of this technology has enabled Florida officials to open a new

336-bed expansion unit for the prison at Raiford only 8 months from ground-breaking at a cost of approximately \$16,000 per cell.

The construction method used at Raiford was first developed for Pinellas County, where the technique reduced costs and saved time in building a new jail. This sharing of experience in

### From the Director

The dilemma of too many serious crimes with injured victims and not enough space to incarcerate convicted criminals is a major domestic policy issue. Convicted violent and repeat serious offenders have contributed to swelling prison and jail populations, which outstrip capacity in many jurisdictions. Given today's fiscal pressures, policymakers face difficult choices. Building and operating prisons are extremely costly. But the price of not expanding capacity also has expensive consequences: increased victims of crime and its attendant fear.

The gravity of the problem is recognized by officials throughout the criminal justice system. In fact, when the National Institute of Justice asked criminal justice officials to name the most serious problem facing the system, police, courts, and corrections officials reached a virtually unanimous consensus: prison and jail crowding is the number one concern.

Attorney General Edwin Meese III has spoken out repeatedly on the dimensions of the crisis and the need to help State and local jurisdictions find less costly ways to increase corrections capacity so convicted serious criminals are pre-

vented from preying on people, communities, and our economy.

Responding to the need voiced by practitioners and the policy statements of the Attorney General, the National Institute of Justice is launching a new corrections construction initiative to help State and local officials make informed decisions on building or expanding facilities.

This *Construction Bulletin*, like others in the series, is designed to share information on advanced construction techniques that hold the potential for saving both time and money in the construction of safe and secure facilities. This *Bulletin* describes how Florida used modular construction methods to obtain expanded corrections capacity required by court orders. Based on the effectiveness of the building technique used in jail construction in Pinellas County, the State of Florida decided to adopt the same approach in constructing a new prison. This transfer of knowledge about new technologies and more efficient construction methods is what the corrections construction initiative is all about.

In addition to the bulletins, the National Institute of Justice is publishing a *National Directory of Corrections Con-*

*struction*, based on the results of a national survey, which provides a wealth of information on construction methods and costs for jails and prisons built since 1978. The National Institute will also maintain, at our National Criminal Justice Reference Service, a computerized data base on corrections construction. Through this *Construction Information Exchange*, those planning to build or expand facilities will be put in touch with officials in other jurisdictions who have successfully used more efficient building techniques.

Surveys indicate that an estimated 95 percent of those in prison in 1979 were repeat or violent offenders. We know from research that repeat offenders are responsible for a large portion of the serious crime that plagues our communities. We also know that prisons do work: while in prison an offender cannot commit additional crimes against innocent victims. If we can drive down the excessive costs of building, State and local officials will be in a better position to provide the additional jail and prison space they need to incapacitate those who victimize again and again.

James K. Stewart  
Director  
National Institute of Justice

Florida represents the premise of the National Institute of Justice corrections construction initiative, the new Federal program that helps agencies planning new facilities benefit from lessons learned by others who have successfully completed new institutions.

## Pinellas County Background

The Florida story begins in Pinellas County, located in the Tampa Bay area, the fastest growing region of Florida. Local officials had been hard pressed to build correctional facilities to keep pace with the rapid rate of growth.

The Pinellas County Sheriff's Department operates a large correctional compound, housing as many as 1,270 inmates on a 37-acre site. In October 1985, 1,122 beds were available. The jail system books an average of 100 prisoners per day, and 85 percent of the custody population are held on felony charges. On average, an additional 950 persons are out of custody daily on their own recognizance.

Like many growing counties, Pinellas County has had a dramatic increase in jail inmate population. In 1978, the Pinellas County jail booked a total of 11,849 prisoners. By October 1985, the year's bookings had already exceeded 30,000—a more than 150-percent increase. The September 1985 average inmate population was 1,044, up almost 70 percent from the September 1978 average of 621.

The county has faced a lawsuit on jail crowding since 1975, and a consent decree was issued in 1979. Since that time, officials have been proceeding with a jail expansion program to comply with provisions of the agreement. The photograph shows an outside view of the Pinellas County Jail.

## New cell concept

County commissioners established a task force to study alternative methods of construction for the new jail. Architects were commissioned to develop a model design according to the committee's conclusions.

The committee evaluated five different construction methods and ultimately recommended that the county rely upon



An outside view of the Pinellas County Jail shows the new compound.

prefabrication to reduce construction time. The option proposed was a system of plant-fabricated concrete cell units. County Administrator Fred Marquis said in a recent letter to the National Institute of Justice, "... we have embarked upon an aggressive construction program, reliant upon the most advanced techniques of management and construction."<sup>2</sup> The system of modular construction had never been tested for Florida correctional facilities, and Pinellas County became the first jurisdiction to use the innovative construction method. Both the concrete modules and the design of the new facility were developed by the architectural firm of Watson and Company, Tampa, Florida.

While fabrication of concrete cell units was underway at the plant in nearby Tampa, efforts were also in progress at the construction site. This "fast track" approach enabled Pinellas County building officials to complete site work and utilities for the new jail while the cells were being poured at the plant. These steps are usually chronological, but prefabrication allows both activities to proceed simultaneously. This system eliminates the usual delays in waiting for completion of such tasks as grading and foundations before erecting the walls. With

this approach, workers can even fasten security hardware on the walls of prefabricated cells before the foundations are finished. Only with advanced techniques is it possible to complete such tasks immediately—tasks ordinarily done in a project's final stages.

The groundbreaking ceremony for the jail was held on May 5, 1984. The first truckload of prefab cells arrived on July 9 with beds attached within the modules, ready for the crane to lift the cells into place. The work was substantially completed in 10 months at a cost of approximately \$14,500 per inmate, or about \$29,000 per two-person cell.

## Jail design

The jail houses 192 inmates in three interconnected, octagonally shaped buildings. The core building is designed to accommodate support functions such as public reception, visiting, multipurpose rooms, nursing and counseling offices, and a central control room for the entire facility. Because the project was designed as an expansion for the existing facility, such support areas as administration and food service were not provided in the new building. Jurisdictions planning a comparable facility as an independent institution would be required to expand the core support building to include such services.

As shown in Figure A, the jail has two housing wings, each consisting of 48 two-person cells arranged around the dayroom areas. The jail is considered medium security. Sheriff Gerry Coleman has been pleased with the modular construction concept. Pinellas County is testing an unusual design—cells are not enclosed. However, since each cell has separate plumbing, the Sheriff may add cell fronts at any time.

Management of the inmate population is accomplished by the officer in a protected control station. Officers in the security enclosure have an unobstructed view of all cells and dayroom areas in the housing units. Inmates have free access to the open dayroom and showers at all times, and they participate in regularly scheduled outdoor exercise.

## Modular Construction

The building system used in the Pinellas County Jail is known as "precast" concrete, because the concrete building units are cast entirely at a plant and then transported to the construction site. In the case of Pinellas County, the

cell modules were made by pouring a special concrete mixture into large steel forms specifically designed for that application. Each form took the shape of an individual cell, measuring 8' wide and 8'8" high. Since Pinellas County planned two-person cells, the units were quite large, containing 92 square feet of interior space. Trucks moved two units at a time, making 70 trips to Pinellas County from the Tampa plant.

Sheriff Coleman is now planning a new maximum security building for the Pinellas County Jail. In this way, the sheriff will have available in one compound a variety of housing options to meet the needs of the different types of inmates booked into the jail.

Scheduled to be built in 1986, the new project also incorporates innovative construction methods, including the concrete cell modules. However, the new five-story building will have solid cell fronts and high security hardware. Sheriff Coleman approved the repeated use of modular units in the new 384-bed maximum security project because of his department's satisfaction with the medium-security facility. There does

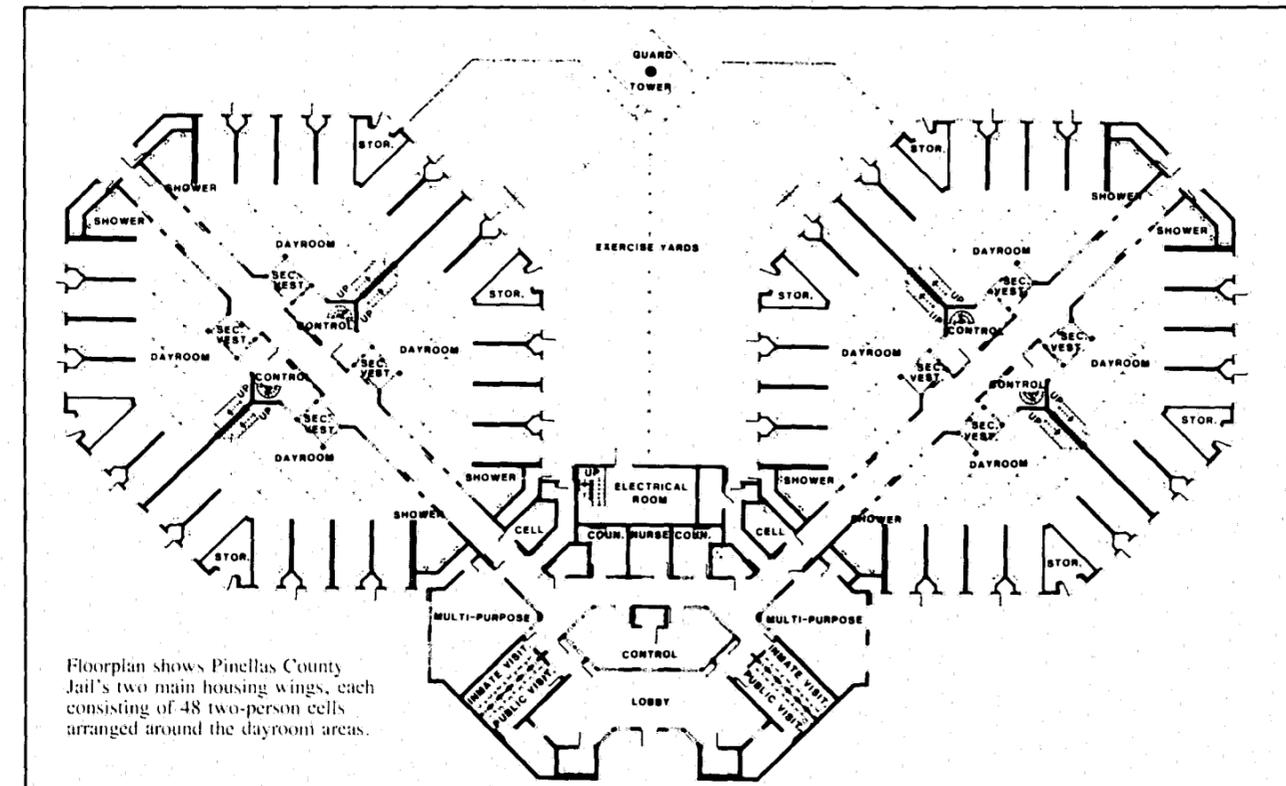
not appear to be a cost premium for the time savings produced by the modular approach. Although estimated to cost \$13.4 million, the planned five-story maximum security building was recently bid for \$12.2 million—or 9 percent under budget.

This new building appears to set a national record. Among projects known to NIJ, concrete modules have never been assembled higher than two stories. Pinellas County's new maximum security building will be the first in the Nation to reach five stories in height.

## Finance method

The county commissioners have demonstrated an impressive commitment to improved conditions in Pinellas County jails. Since 1974, they have approved 11 different building projects, totaling more than \$33 million. None of the projects has required issuance of bonds, and no public debt has been created. In each case, an appropriation has been made from the county's general fund as part of the annual budget.

Figure A



Floorplan shows Pinellas County Jail's two main housing wings, each consisting of 48 two-person cells arranged around the dayroom areas.



A crane lifts one of the innovative cell modules into place at the Florida Mining and Minerals Plant in Tampa, Florida.

## Union Correctional Institution

### Background

With 28,309 inmates in 1985, the Florida Department of Corrections is the fourth largest prison system in the Nation.<sup>3</sup> Surveys conducted by the U.S. Department of Justice show that the number of Florida prison admissions per 100 serious reported crimes has increased significantly in recent years. The rate has grown from 2.4 per 100 in 1980 to 4.1 in 1983, an increase of 70 percent in only 3 years.<sup>4</sup> At the current rate of growth, available space will soon be gone. From 1983 to 1984, the prisoner count advanced from 26,334 to 27,106, an increase of approximately 3 percent. However, the first half of 1985 brought the total to 28,309 inmates, a 4-percent jump in 6 months, greater than the increase for all of 1984.<sup>5</sup>

The main housing unit of the Union Correctional Institution at Raiford, located near Jacksonville, has been called the "Rock" almost since its opening day in 1912. It has seen many changes in the Florida Department of Corrections. While working as Chief Correctional Officer, the present Secretary of the Department of Corrections was wounded by gunfire in an escape attempt at the old prison. Although the "Rock" had endured for more than 7

decades, it now stands empty, closed by a court order on June 30, 1985.

When a lawsuit was filed against the State of Florida in 1972, officials recognized that the "Rock's" days were numbered. To comply with contemporary facility standards, vast expenditures would have been required for repairs and remodeling. Florida reluctantly agreed to close the facility in a consent decree signed in 1975.

Replacement capacity had to be provided: the department decided that a portion of that capacity would be in a new nearby facility, which had to be ready for occupancy by a June 30, 1985, deadline established in the court order. The new facility at Union Correctional Institution, described below, added 336 beds of the required replacement capacity. At the same time, the State opened a Reception Center in South Florida, and a new correctional institution in Martin County, Florida.

With completion of these new facilities, Florida absorbed the loss of the "Rock." Yet officials are not optimistic. Under Florida statutes, the maximum capacity of all institutions cannot house more than a total of 28,756 inmates. When this limit is exceeded, Florida law requires that inmates must be released. By the time the new construction was completed in 1985, the population already exceeded 28,000. Officials anticipate their new prison capacity will be entirely exhausted by April 1986.<sup>6</sup>

### New expansion unit

State officials had closely monitored the progress in building the Pinellas County Jail. In addition, a number of projects had been built by the Department of Corrections, and administrators were analyzing the advantages of alternative building methods. To make the most from funds allocated by the legislature, corrections officials decided to pursue the fastest and most economical option for construction. Based on a study that considered cost factors, and lack of masons in the rural area, the construction manager recommended use of precast concrete cells. The preconstruction study by the Federal Construction Company showed significant cost savings for modular construction when compared to conventional construction techniques. The photograph at left shows construction using the cell module concept first tested in Pinellas County.

The prison project was a larger undertaking than the Pinellas County Jail, and there was less time in which to complete the project. The facility services staff of the Department of Corrections immediately went to work on a new design, using the architectural firm of Hansen, Lind, Meyer of Orlando. The precast plant in Tampa would have to produce 336 units and ship the cells 165 miles to the remote prison site. The new prison buildings had to be high security facilities with steel sliding doors and solid concrete cell fronts. The modular cells were designed for single occupancy with solid fronts, containing 63 square feet of interior space. Each cell module weighed 10.5 tons.

Florida Department of Corrections staff began design in July 1984 and decided to use the "fast track" method of construction. Four months later, the design was approved. Site work began October 15, actually 2 weeks before the final plans were completed, and the first concrete cells were delivered to the site on November 15, 1984. Placement of the cells required slightly less than 3 months: the last unit was fitted into place on February 7, 1985.

Hardware and fixtures were completed at the site, together with finish work such as painting and floor surfaces. Utilities and electronics were more time consuming, as is usually the case. A fast, inexpensive roof system, typical of residential construction projects,

was easily installed on top of the modules. These remaining tasks consumed an additional 3 months. The new prison facility was ready for occupancy on June 15, 1985, 2 weeks prior to the court's deadline. Officials were satisfied that their objective of rapid completion had been achieved, as inmates occupied the new facility only 8 months after groundbreaking.

### Prison design

As shown in Figure B, the new unit at Union Correctional Institution is a linear design with cells on both sides of a central corridor. Two buildings were completed, each containing 168 single-occupancy cells. Modular units were stacked two stories high, and each building consists of three radial wings connected to a central core area. Support spaces are limited to central control, interview rooms, medical offices, and a counseling room.

The new buildings have been planned for high security and complete isolation of inmates in specialized classifications, emphasizing no visual or aural interaction between inmates. Although modular units may be used in a variety of contemporary dayroom designs, Florida officials decided the linear arrangement was most appropriate for this housing category. Prisoners held in protective custody and others who cannot be housed with the general inmate population are assigned to the special facility. As shown in Figure B, officers are stationed in the central core area, and patrol the corridors for intermittent monitoring of inmates in their cells. As no dayrooms or activity areas were desired by Florida officials, inmates are in their cells at all times except for use of showers, visiting, and outdoor recreation.

Since this project was completed within the perimeter of an already existing institution, a number of important support services are drawn from the other buildings. For this reason, construction costs do not include security perimeter, kitchen, industries, administration, hospital, and other buildings already at the site.

Concrete cell units for both Union Correctional Institution and the Pinellas County Jail were fabricated by Florida Mining and Minerals in Tampa, Florida.

### Finance method

The State of Florida has not relied upon debt financing for any of the correctional institutions noted here. In each case, the legislature has taken funds from reserves and the annual budget, without adding to the public debt. For this reason, bonds have not been sold to finance the construction of prisons.

### Analysis of construction methods

Through reliance upon modular cell units, both Florida projects have minimized costs and time required for construction. This technique differs from other methods of prefabrication through casting of an entire cell or "monolithic" unit. Alternative precast technologies use smaller individual building components, such as flat slabs and panels, rather than complete cell modules. Both systems are innovative to corrections, and researchers are now considering which approach may be most advantageous. Table 1 shows a comparison between the Florida approach and the use of components in other construction projects. (Other *Construction Bulletins* will describe prisons and jails where these alternative systems have been employed.)

### Summary

The Florida story shows that critical deadlines can be achieved through the use of modern construction methods. As it was imperative for Florida officials to complete a new expansion facility on time, they did not attempt to start from scratch. Future issues of *NIJ Construction Bulletins* will focus on tested building techniques and show how these methods have been adapted to a variety of designs and locations. In this way, it is hoped that corrections officials will learn from the experiences of each other, and there will be no reason to "reinvent the wheel" when building a new jail or prison.

Charles B. DeWitt is a research fellow at the National Institute of Justice, serving as Project Director for an NIJ grant to investigate new methods for expansion of jail and prison capacities. Mr. DeWitt was formerly Director of the Justice Division in Santa Clara County, California, where he was responsible for planning and construction of new correctional facilities.

Table 1

### Comparison of Prefabricated Concrete Methods

#### Advantages of modular units:

##### "Monolithic" design

**No joints**—as cell is cast as one unit, absence of cracks or joints results in security advantages over panels

**No grouting**—absence of seams and spaces saves time and money for placement of grout as required with panels

##### Field construction

**Shorter time period**—modules mean fewer pieces than panel system, resulting in fewer crane lifts

**Simplified process**—modular units stand alone, no shoring or shims are required for stability as with panel system

##### Prefabrication opportunities

**Utilities**—plumbing and electrical may be integrated at plant, fewer connections in the field

**Hardware and fixtures**—units may be fully equipped/furnished before shipment to construction site

#### Disadvantages of modular units:

##### Economic issues

**Highway limits**—large size and extreme weight of cell modules is sometimes restrictive

**Site**—weight of modules requires heavy crane, speed of field erection slowed by production limits

##### Design concerns

**Size constraints**—design must accommodate cell units of fixed size, possibly less flexible

**Aesthetic issues**—modules may require exterior facade or coating

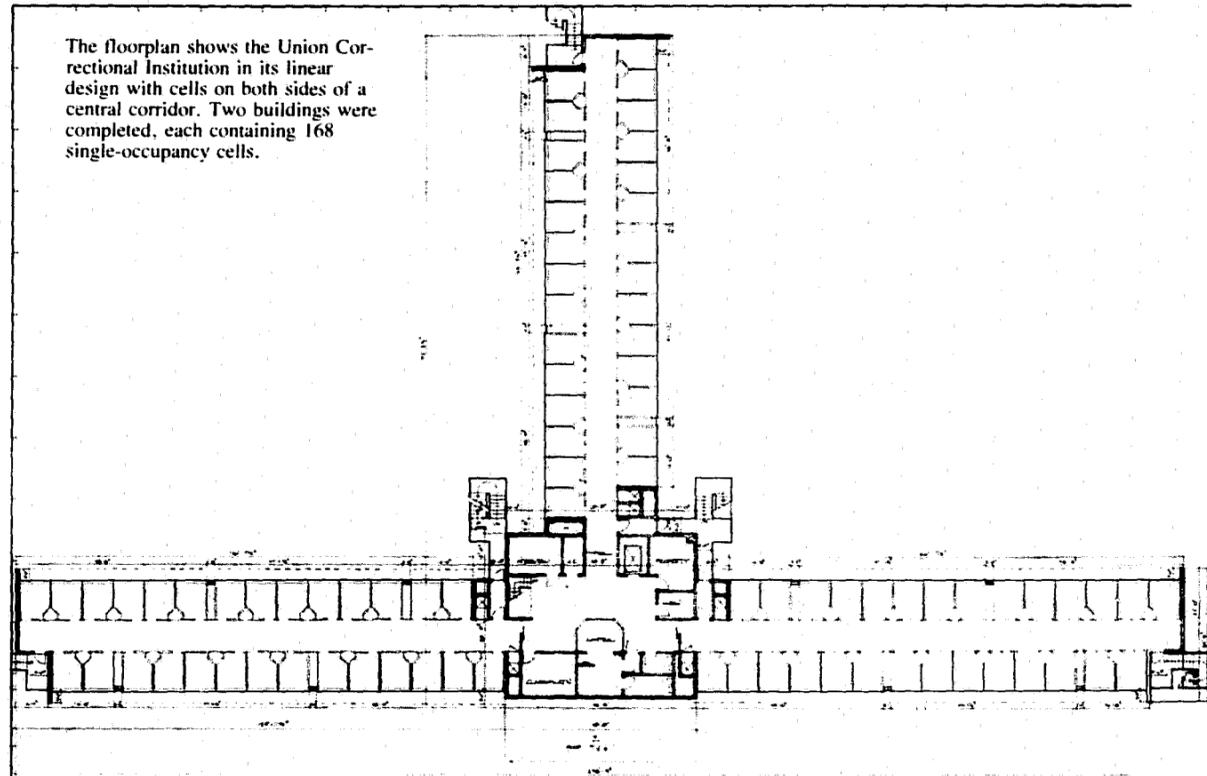
##### Production questions

**Plant limitations**—very limited production volume, redundancy of walls, costly forms

**Administrative concerns**—limited number of producers, need for plant proximity, possibly proprietary designs

Figure B

The floorplan shows the Union Correctional Institution in its linear design with cells on both sides of a central corridor. Two buildings were completed, each containing 168 single-occupancy cells.



### Facility Profiles

#### Pinellas County Medium Security Facility

**Jurisdiction:** Pinellas County, Florida  
**Facility:** County jail

**Type of Construction:** new facility, built at existing compound with support services

**Number of Beds:** 192  
**Number of Cells:** 96 two-person cells  
**Total Cost, Including Site Work:** \$2,976,221

**Building Cost Only:** \$2,787,600  
**Building Cost Per Cell:** \$29,032;  
\$14,516 per inmate  
**Total Cost Per Cell:** \$31,002;  
\$15,501 per inmate

**Building Cost Per Square Foot:** \$93  
**Size of Facility:** 29,985 square feet:  
24,382 square feet of housing;  
5,603 square feet for support space

**Space Per Inmate:** 156 square feet  
**Start Date:** May 1984  
**Completion Date:** March 1985  
**Construction Time:** 10 months

#### Union Correctional Institution

**Jurisdiction:** Florida Department of Corrections, Raiford, Florida  
**Facility:** State prison

**Type of Construction:** new facility, built at existing compound with support services

**Number of Beds:** 336 inmates  
**Number of Cells:** 336 single cells  
**Total Cost, Including Site Work:** \$5,773,179

**Building Cost Only:** \$5,522,000  
**Building Cost Per Cell:** \$16,435  
**Cost Per Square Foot:** \$96

**Size of Facility:** 57,520 square feet:  
47,680 square feet for housing;  
9,840 square feet for support space  
**Space Per Inmate:** 171 square feet

**Start Date:** October 1984  
**Completion Date:** June 1985  
**Construction Time:** 8 months

#### NOTES

1. Letter to Project Director dated June 19, 1985, in which Florida Department of Corrections agrees to serve as a study site for the National Institute of Justice.

2. Letter to Project Director dated June 20, 1985, in which Pinellas County agrees to serve as a study site for National Institute of Justice.

3. The reported 1985 mid-year population of Florida prisons was 28,309 inmates. Larger systems are California: 47,075; Texas: 38,028; and New York: 34,597. Bureau of Justice Statistics, 1985 data, released on September 15, 1985.

4. Federal Bureau of Investigation, 1983 (most recent year for which data available) *Uniform Crime Reports*, also cited in *Prisoners in 1984*, Bureau of Justice Statistics, p. 8.

5. *Prisoners in 1984*, op. cit., and Bureau of Justice Statistics data, released September 15, 1985.

6. Information from Office of Information Services, Florida Department of Corrections, Vernon Bradford, 904-488-0420.

#### For Further Information ...

##### Pinellas County:

**Sheriff:**  
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813-587-6200

or

Walter Jacques, Project Coordinator  
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813-535-6415

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813-876-2411

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813-462-3251

##### General Contractor:

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Clearwater, FL 33518  
813-531-1466

##### Concrete Cells:

Bob Mitchell, Manager  
Florida Mining and Minerals  
13228 North Central Avenue  
PO Box 23965  
Tampa, FL 33679  
813-626-1141

##### Florida Department of Corrections:

##### Superintendent:

T.L. Barton  
Union Correctional Institution  
PO Box 221  
Raiford, FL 32083  
904-431-1212

##### Architect/Engineer:

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William Stimson, AIA  
Hansen, Lind, Meyer  
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Orlando, FL 32801  
305-422-7061

##### Facilities Services

##### Administrator:

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Ned Terry, Architect Supervisor  
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Tallahassee, FL 32301  
904-488-5021

##### Contractor:

Federal Construction Company  
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813-821-8000

##### Concrete Cells:

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13228 North Central Avenue  
PO Box 23965  
Tampa, FL 33679  
813-626-1141



Workmen onsite at the Pinellas County Jail oversee the construction of the prefabrication cell units. These concrete units were designed and developed in Tampa and shipped to Pinellas for use with this "fast track" approach.



Union Correctional Institution

**Construction Information Exchange**

The Construction Information Exchange is a Federal initiative designed to provide information on construction methods and costs for jails and prisons built since 1978. Through the exchange, those planning to build or expand facilities will be put in touch with officials in other jurisdictions who have successfully used efficient building techniques. Publications include these

bulletins and the National Directory of Corrections Construction. For more information, or to submit information for inclusion in the Exchange, contact:

Construction Information  
Exchange/NCJRS  
Box 6000  
Rockville, MD 20850  
Telephone: 800-851-3420  
or 301-251-5500

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