Journal of Critical Reviews
ISSN- 2394-5125 Vol 7, Issue 8, 2020

BEYOND THE BAR (REFORMATORY PRISON)
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Received: 12.04.2020 Revised: 11.05.2020 Accepted: 08.06.2020

Abstract
Prison layout, as a sort of construction, strongly pushes the architect's ethical function into perspective. Architecture is a main component in prison modernization programs and a cornerstone for several organizations. Thus, this work presents a proposal on developing a reformatory prison project in Dahran Aljunob, Saudi Arabia. The main focus of this project is to develop a comfortable and productive environment for the inmates that is coherence to the Islamic principle. For this work, 3 case studies related to prison design was analysed. Furthermore, for the current prison project development, the estimated gross floor area is 24000 m2. The zone of the prison structure consist of housing, education area, social area, healthcare area, staff area, office area, investigation area, master control area and logistics. In this work, site 1 was chosen as the development site, as it attained the highest evaluation score of 62, and it is located at Dhahrin Aljunoub south of Saudi Arabia. This prison is designed to create a healthy and comfortable environment for the inmates and will help them to become productive people and benefit society once they are out of prison.

Keywords–prison, architecture, design, building, Saudi Arabia

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DOI: http://dx.doi.org/10.31838/jcr.07.08.56.

INTRODUCTION
Prison is a structure through which individuals are lawfully detained as penalty for a felony they have committed [1]. The architecture and structure of prisons and jails, and their perspectives, policies and challenges of the system, are inextricably linked to their environment that it is build on [2]. Inmates would be kept in climate-controlled locations. These rooms sometimes cause solitary confinement and disorientation, leading to psychological and physical pain in line with interrogation techniques used by the authorities [3]. Urban prisons are generally constructed in bleak, forbidden buildings encircled by elevated and strong buildings [3]. Internally, radial and wedge shaped models were preferred, even though there were small differences in legal authority. Other outstanding architecture and functional developments in the prison to support authorized management included the disposal of food and leisure operations into residential spaces [4]. In fact, the plans included outdoor leisure places and educational facilities. Cells were equipped with bathrooms, hand basins, and in some instances showers to lessen the inmate abuse related with mutual facilities [5]. In fact, cells were constructed with ambient light and ventilation. In addition, faculty-style prisons were introduced, which imitated the architecture techniques used to develop education and health care centres [6].

Prisons from the perspective of Islamic law could be necessary to achieve certain social and legal goals, and they could also be banned if the practices it uses violate any of the Islamic principles [7]. Freedom is one Islamic principle that is directly related to prisons [8]. A fundamental rule says that freedom is the law-giver’s goal. Therefore, a prison could not be used to restrain the freedoms of people unless it is judged that this freedom will cause substantial harm to society [8]. The prisons and detention centers in Saudi Arabia were in conditions that did not meet the requirement of the Islamic principle [9]. The prisons’ physical situation was characterized by overcrowding. Thus, this work presents a proposal on the development of a reformatory prison project in Dahran Aljunob, Saudi Arabia. The prison will create a healthy and comfortable environment for prisoners who are seeking social and professional development while in prison.

CASE STUDIES
In this work, for the development of reformatory prison project, three case studies have been referred. The case studies referred are:

a. Mas d’Enric Penitentiary prison in El Catllar, Catalonia, Spain
b. Holmsheidi Prison in Rykjavik, Iceland
c. East Jutland State Prison, Denmark

Mas d’Enric Penitentiary prison in El Catllar, Catalonia, Spain
Mas d’Enric Penitentiary prison is located at El Catllar, Catalonia, Spain (Figure 1). This prison structure was designed by AIB architects and Estudi PSP architects. The site project consist of 130163 m2, with total building area of 74130 m2. The capacity of this prison is 500 cell. The architects designed a chiseled green sprawl for a prison complex. The structures of the Mas d’Enric Penitentiary slink in the surrounding forest, low-slung and painted green, and the architects’ scheme to incorporate the surrounding topography, where each cell has a woodland view and provide airy courtyards that play into the plan to create a “non-oppressive environment.” Both typological and topological design strategies are central to the Mas d’Enric Penitentiary project. In terms of typological, the design moved beyond conventional modern prison architecture by creating a revised mat building; the prison is extensive in plan and low to the ground. Contiguity eliminates residual spaces between buildings. It also allows for organizational flexibility while generating exterior spaces in the form of courtyards on different scales. On the other hand, the topographical adaptation allows for a gentle integration with the terrain. It creates spatial variety while allowing for the absence of any kind of interior fencing. Distant views of the mountains are made possible by an articulation of the ground level. Views of the adjacent woodlands improve conditions in both the cells and the courtyards. Furthermore, each courtyard borders the perimeter of the site, giving prisoners a view out towards the woodland, and prison cells also face out towards the trees. In addition, this prison site
Holmsheidi Prison in Rykjavik, Iceland

Holmsheidi Prison is located at Rykjavik, Iceland (Figure 2). This prison was designed by ARKÍS Architects. The site area of this prison is 37400 m$^2$ and the build area was 3595 m$^2$. The capacity of this prison is 56 cell. This prison is specifically for women. The prison design is based on three key elements. The design of the prison is based on three key elements. First, is a main guard station as a central cylindrical form washed by daylight from a surrounding skylight. The skylight and guard station rise up from the building as a smooth cone, contrasting the buildings sharp edges. The second set of elements is internal courtyards forming the heart of each cell block. The courtyards let daylight into the cell blocks, allowing the possibility to spend time outdoors and in some cases; prisoners enjoy views into the courtyards. The third set of key elements is a protrusion from each individual cell. The protrusions serve the dual purpose of granting each prisoner view and daylight, while limiting the cone of vision so that it is not possible to see from one cell to another.

The Holmsheidi prison strives for a safe and humane prison system that optimizes all working conditions. The prison creates a positive environment through its openness. Reducing running costs and increasing staff control and efficiency, while creating a respectable human atmosphere and encouraging prisoners to re-socialize the outside world is the goal. The site of this prison is far away from the town and it is located in a dense forest location. This prison structure also comprises of administration building and law office, cells, gym, service areas for prisoner, service areas and educational areas.

East Jutland State Prison, Denmark

East Jutland State Prison is located at Horsens, Denmark (Figure 3). This building was designed by architects Friis & Moltke. The size project consist of 130000 m$^2$, with build area of 28500 m$^2$. The capacity of this building is 228 cell. The prison contains eight separate building clusters, linked to the internal road network like pears on a string. Each building surrounds a natural dip in the ground, benefiting from the view of the inner courtyards and gardens of the prison. Each building section consists of four standard sections, each with its own employment area, top-security section, cultural facilities (including a church, sports facilities, shop and library), an area for visitors, a gatehouse and staff facilities. The prison has space for nearly 230 inmates, who are separated into five divisions according to their level of risk. Four of the divisions are identical, each containing 24 cells providing space for 48 inmates. The fifth division is used for isolation, and is also used to house higher risk inmates. This division also houses the prison’s medical department. Furthermore, the complex is located in the open,illy countryside of Enner Mark west of the town of Horsens. It is surrounded by fields, grazing cattle, hedges and scattered farm buildings. Thus, this location is far from the town. In addition, the East Jutland prison is very modern in terms of both security and design. Security measures include fingerprint readers instead of keys, high walls, and two long fences. All outdoor areas are video monitored, and there are also motion sensors and cameras throughout the prison. In addition, this prison structure also comprises of administration building and law office, cells, gym, football court, service areas, educational areas and social areas.

**Figure 1. Masd’Enric Penitentiary Prison**

The Holmsheidi prison strives for a safe and humane prison system that optimizes all working conditions. The prison creates a positive environment through its openness. Reducing running costs and increasing staff control and efficiency, while creating a respectable human atmosphere and encouraging prisoners to re-socialize the outside world is the goal. The site of this prison is far away from the town and it is located in a dense forest location. This prison structure also comprises of administration building and law office, cells, gym, service areas such as kitchen, toilets and etc, educational areas and social areas. The design focuses on creating an environment that gives prisoners the possibility of improvement. Furthermore, the security system will be very extensive and will include the building, the yard as well as the exterior fence. The system will entail a security camera system, a security door control system, a special communication system as well as a movement detection system.

**Figure 2. Holmsheidi Prison**

**Figure 3. East Jutland State Prison**

**PROGRAM AND SPACE DETAILS**

For the proposed reformatory prison project, and the estimated gross floor area is 24000m$^2$ to accommodate for 800 prisoner, and 266 staff. Based on Table 1, the total estimated net area is 18000 m$^2$ with build foot print area of 9070 m$^2$. In addition, this structure comprises of several zones, such as housing, education area, social area, healthcare area, staff area, office area, investigation area, master control area and logistics.

**Table 1. Space details**

| Zone          | Percentage (%) | Gross floor area (m$^2$) | Net area (m$^2$) | Foot print (m$^2$) | No. of floor |
|---------------|----------------|--------------------------|-----------------|-------------------|-------------|
| Housing       | 40             | 9600                     | 7200            | 4800              | 2           |
| Education     | 13             | 3120                     | 2340            | 1040              | 3           |
| Social area   | 13             | 3120                     | 2340            | 1040              | 2           |
| Healthcare    | 8              | 1920                     | 1440            | 640               | 3           |
| Staff area    | 8              | 1920                     | 1440            | 640               | 3           |
| Offices       | 6              | 1400                     | 1080            | 480               | 3           |
| Investigation | 1              | 240                      | 180             | 120               | 2           |
| Master        | 1              | 240                      | 180             | 60                | 4           |
| control       |                |                          |                 |                   |             |
| Logistics     | 10             | 2400                     | 1800            | 800               | 3           |
| Total         | 100            | 24000                    | 18000           | 9070              | -           |
PROPOSAL SITE
Proposed site: Site 1
For Site 1 (Figure 4), the site located at Dhahran Aljanoub south of Saudi Arabia in between of two main province Jazan and Najran, which is in the south of Aseer province. The area of the site is estimated to be 67,200 m².

Proposed site: Site 2
For Site 2 (Figure 5), this site is located at Taif. It is on the Maklah Almukrmah road, north of the Taif airport.

SITE EVALUATION AND ANALYSIS
For this work, two sites were proposed. Hence, for this two sites, site evaluation was done to determine the most suitable site. For the site evaluation, weighting factors were used. It comprised of three level, which were 1 = not very important, 2 = slightly more important, and 3 = important. Furthermore, the sites were evaluated based on several conditions, which were site capacity, surroundings, security and safety, future development plans, technical requirements, visibility and accessibility.

Table 2. Site criteria and evaluation

| Site Criteria                  | Site 1 | Site 2 |
|-------------------------------|--------|--------|
| Site capacity (WF=3)           | 15     | 13     |
| Surrounding (WF=3)             | 15     | 12     |
| Security and safety (WF=3)     | 12     | 10     |
| Visibility (WF=2)              | 10     | 5      |
| Future development (WF=2)      | 5      | 10     |
| Technical requirements (WF=2)  | 10     | 5      |
| Accessibility (WF=1)           | 5      | 5      |
| Total                          | 62     | 58     |

PROJECT DESIGN
This proposal introduces a new prison approach that is oriented towards a particular category of prisoners (age 19 to 30). This prison is designed to create a healthy and comfortable environment for the inmates. The prison will be a balanced mix of housing, educational, medical and social facilities that affect the human soul, and it will help them to become productive people and benefit society once they are out of prison. Furthermore, there are additional areas that would help the prisoners use their skills in something good and take off all the negative energy inside them, such as sports areas, social areas, exhibitions and workshops. The natural environment is very important, so it was included in these prison studies as green areas, special materials and shadowing studies were used to make it more comfortable. Cold colors were used for psychological reasons to make the prisoners more comfortable. In addition, this prison is designed with roof garden and solid voids are certain area of the structure.

Figure 6 shows the zoning of the proposed prison project. The zoning is comprised of housing, service area, staff area, mosque, education area, health care area, administration area, gym, public area, investigation room, visitation area and entrance. Figure 7 shows the overall view of the proposed prison development. Figure 8 shows the room setting for a single cell prison.
CONCLUSION
This work has proposed the development of a reformatory prison project in Dahran Aljunob, Saudi Arabia. The selected site is located at Dhahran Aljunob south of Saudi Arabia in between of two main province Jazan and Najran. This proposed reformatory prison is designed with accordance to the Islamic principle where main concern was to provide comfort and freedom within the prison for the inmates. In addition, the prison will be special of its kind, focusing on improving the social and productivity aspects of the inmates by providing suitable rehabilitation environment and facilities. Thus, once the prisoners are free from their sentence, they will be able to contribute positively to the development of Saudi Arabia’s society.

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