



## MODERN TECHNOLOGY IN CAR PARKING SYSTEM

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### Abstract

As the development of modern era, there is a increase in urbanisation & industrialisation. At the same time there is tremendous growth of population of the country. It results into rapid increase in the number of vehicles on the road. Average person of the country use the four wheeler in the form of car. At the same time people faces the land scarcity for parking purpose

It is necessary to provide such a system for parking of cars, which is convenient for everyone in terms of adoptability, safety, time saving. Multilevel car parking is the same kind of system which will be beneficial for the future.

**INDEX TERM:** Multilevel car parking system, RFID technology, Automated Parking, Sensor, GSM, PIC controller.

### INTRODUCTION:

Since last five decades, due to increased urbanisation and increase in vehicles on the road, car parking has become a major issue of traffic management. Multi-storey car parks, underground or basement car parks, and car parks in a multi-function building are common. Often, visitors gain their first impressions of a town from its car park, as this may be the first building with which they come into contact. The inferences are obvious. Although multi-storey car parks are mainly found in city and town centres, they also feature in airports, retail canter, conference canter, hotels, and housing developments, places of employment (both offices and factories), and places of entertainment, railway stations, and sports facilities.



**Fig 1.0** The Genesis multi-storey car park, World Cargo Centre, Heathrow

Certain features are common to all of these and essential if the car park is to full fill its function. Potential users should be able readily to identify a car parking facility and its entrance. In urban areas, it helps if a public multi storey car park can be easily recognized for what it is such car parks usually open

structures to permit natural ventilation and no higher than about 15m. Their main structural lines are typically near horizontal and, to meet circulation requirements they may have external ramps.

Free standing multi-storey car park is essentially a functional building generally composed of a series of floors supported on columns to provide large areas of uninterrupted floor space. Therefore engineering considerations tend to be the primary driver for the solutions, rather than appearance. Little weather protection is required, and there is generally no need to roof over the top floor.

Salient Features of the System-

#### 1.1 DESIGN BRIEF:

The purpose of the design brief is to establish the technical aspects and constraints affecting the design. After the feasibility design, the whole brief should be reviewed again and any necessary changes agreed. However, since several alternative designs may have to be evaluated, it is important at the outset to agree with the client what criteria are to be adopted for the choice of the preferred solution.

#### 1.1.a. Information to be considered for design in the brief:

##### • Objective

A car park can be used for a number of separate purposes, or a combination of them, for example:

- A public car park operated as a public service for profit or through a subsidy.

- A facility for a specific development where the pattern of use may be expected to remain reasonably constant throughout the day.
- A facility for a given activity that will generate high peak demands at given times or lead to the assumption that there may otherwise be special design considerations. This could include provision for tidal flow.

- **The site-**

The brief should contain a full description of the site and its environs, with particular note of the adjacent highway network. The status of land at the time of writing the brief must be disclosed, particularly any restraints imposed by covenant or otherwise on building or access.

- **Site conditions-**

Data on site conditions should be determined and stated particularly subsoil conditions including water table and drainage levels, as these are particularly important to the design of car parks. The arrangements for site clearance and collection of design data on ground conditions should be explained. Requirements for, and the value of, further investigations should be considered.

- **Highway access-**

The purpose, layout, and present and future use of the adjacent highway network should be considered in the process of developing detailed entrance and exit arrangements and management policy.

- **Building life-**

The life of a car park is conditional on the design specification and on the quality of construction and maintenance. The influence of these issues on the building life should be made clear to the client at the outset.

## 2.0 ADVANTAGES OF MLCPS:

- **Space Optimization**
- **Cost- Effectiveness**
- **Convenience**
- **Security**
- **Aesthetics**
- **Environmental Protection**
- **Low Maintenance and Operational Cost**

## 3.0 TYPES OF MULTILEVEL CAR PARKING SYSTEM:

- Two step stacker type parking system
- Puzzle Parking System-
- Stacker Crane Parking Systems
- CART Parking System
- Tower –Square Type System

## 4.0 GEOMETRIC DESIGN AND LAYOUT:

Although a car park is designed to suit the local environment with appropriate linked facilities for pedestrian movement, its use should be seen as an operational ‘non-event’ to the customer. This means that the designer should consider the full range of operational elements to achieve a comprehensive design solution that results in a safe, easy-to use, high-quality car park. This design process is influenced by the parking purpose, how often users visit, payment and control systems, and relationship to the external highway network.

### 4.1 GEOMETRIC REQUIREMENTS:

In the layout of parking system, following points should be considered

- Bay width and length-
- Aisle width and bin width-
- Side clearance on structure-
- Column location-
- Headroom-
- Floor gradient-
- Ramp and access way gradients-
- Ramp and access way curvature, widths and clearance on structure-
- Super elevation-
- Kerb height-
- Entry and exit arrangements-

### 5.0 FIRE CONSIDERATIONS

The structure of a modern multi-storey and underground car park is likely to use non-combustible materials and is considered a low fire risk. However, the cars parked in it pose a fire risk. For this reason and the need to provide a means of escape, the recommendations in this chapter need to be considered to limit the impact of a fire and provide means to control it.

A car park is a designated use. This makes it possible to treat fire considerations in a different way to those adopted for general buildings whose use might change. Fire spread from vehicle to vehicle is the major concern when considering fire loading in the enclosed car park.

Factors governing safety measures:

- Volume of the building
- Height of the building
- Use of basement construction
- Provision for ventilation
- Provisions for adequate smoke control
- Distance from the boundary or the distance to other buildings
- use category of other parts of the same building or adjacent buildings
- Accessibility of the car park to fire-fighting appliances

- Spacing and adequacy of fire-protected pedestrian escape stairs
- Provision of petrol interceptors
- Special zoning requirements.

## 6.0 CASE STUDY- KOLKATA CAR PARKING SYSTEM



**Fig. 2.0 Car Parking System in Kolkata**

Kolkata is the capital of the Indian state of West Bengal. It is located in eastern India on the east bank of the River Hooghly. As of 2001, Kolkata city had a population of 4,580,544, while the urban agglomeration had a population of 13,216,546. The Kolkata Municipal Corporation (KMC) area has registered a growth rate of 4.1% during 2001-11, which is the lowest among the million-plus cities in India. When referred to as Calcutta, it usually includes the suburbs, and thus its population exceeds 15 million, making it India's third largest metropolitan area and urban agglomeration as well as the World's 8th largest Agglomeration.

### CONCLUSION:

As population is increasing day by day vehicles on roads are also increasing. This features the need for car parking systems. Free-standing multi-storey car park is essentially a functional building generally composed of a series of floors supported on columns to provide large areas of uninterrupted floor space. It accommodates maximum cars in minimum space. In India car parks are designed and manufactured to provide cost effective solutions. While preparing this report we came to know various advantages of MLCPS. In this report we have stated all considerations regarding multi-level car parking system. It includes-

- Types Of MLCPS
- Design Considerations
- Fire Considerations Etc.

We have studied and prepared a case study of Kolkata car parking system.

### SCOPE OF THE PRESENTATION-

This discussion is intended for the use for general study of multi- level car parking system. The scope primarily relates to multi-storey car parks above and below ground, for access and use by the public. Single or ground-level car parks, car parks using mechanical

stacking systems and small private access car parks – where different operational requirements and standards may be considered acceptable – are not specifically covered.

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### REFERENCES:

- [1] Mala Aggarwal, Simmi Aggarwal and R. S. Uppal, Comparative Implementation of Automatic Car Parking System with Least distance Parking Space in Wireless Sensor Networks, IJSRP, Volume 2, Issue 10, October 2012.
- [2] M. M. Rashid, A. Musa, M. Aatur Rahman and N. Farahana, A. Farhana, Automatic Parking Management Syatem, IJMLC Vol. 2, No. 2, April 2012.
- [3] R. Mithari, S.Vaze, and S. Sanamdikar, Automatic Multistoried Car Parking System, IJITAM, Volume 1, Issue 6, March 2014.
- [4] M. A. Mazidi, Janice, Gillispie Mazidi, The 8051 Microcontroller And Embedded System.
- [5] M. Ahmed, W.G. Wei, Study on Automated Car Parking System Based on Microcontroller, IJERT, Vol. 3, Issue 1, January 2014.