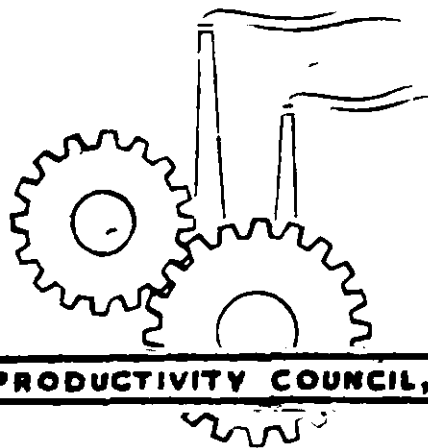


*Report of Indian productivity team*

*Factory building, layout  
and construction in Japan,  
U.S.A. and Italy*



**NATIONAL PRODUCTIVITY COUNCIL, INDIA**

## NATIONAL PRODUCTIVITY COUNCIL

NPC activities are directed towards the objective of increasing the national wealth and the standard of living of the people by stimulating increase of productivity in various spheres of the nation's economy, particularly in industries.

The National Productivity Council is an autonomous organisation established by the Government of India. It has on it, representatives of the Government of India, organisations of employers, workers and various other elements interested in the productivity drive. Established in 1958, the Council conducts its activities in collaboration with other organisations and institutions, interested in industrial productivity. It is carrying the productivity drive to the plants through the Local Productivity Councils which have been established in industrial centres all over the country.

The purpose of the NPC is to stimulate productivity consciousness in the country ; to maximise the utilisation of all available resources ; to wage war against waste ; to help secure for the people a better and higher standard of living. To this end, it disseminates information about techniques and procedures, organises a number of programmes. It arranges conferences, study groups, lectures and training courses, an Advisory Service and Technical Enquiry Service, and publishes publications, films and exhibits for propagation. Through these exhibitions for propaganda through media it seeks to carry

NPC stimulates productivity in the country by organising in-plant visits and inter-plant visits and lays the greatest emphasis on programmes that suit different levels of productivity and aims at developing appropriate attitudes of workers.

NPC sponsors training in engineering, industrial management and industrial productivity teams abroad for studies in general in specific subjects of individual industries.

Reports of these Teams are published by NPC. This is the seventh report in the series. The first six were : (i) Productivity in industries of USA, West Germany and United Kingdom (ii) Small Scale industries in USA, West Germany, Sweden and Japan (iii) Road Transport Industry in West Germany, UK and USA (iv) Plastics Industry in USA, Italy & Japan (v) Cotton textile industry in USA, Japan, West Germany, France & Switzerland, and (vi) Industrial Management Organisation and Training in West Germany, UK & USA. One more Report on Coal Mining Industry is in the press and will be available shortly. NPC is publishing these Reports so that industrial managements in India may gain the necessary knowledge for maximising productivity within their concerns.

*npc report number 7*

*Factory Building,  
Lay-out & Construction in  
Japan, USA & Italy*

*March, 1961*

**National Productivity Council**  
**38 Golf Links**  
**New Delhi India**

**Price Rs. 2.00**

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## THE TEAM

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3 C P Malik	Director, National Buildings Organisation	11-A, Janpath, New Delhi
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7 R P Mhatre	General Manager, Hindustan Housing Factory	Jangpura New Delhi
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9 Prof G S Ramaswamy	Assistant Director	Central Buildings Research Institute, Roorkee
10 M K Jadhav		C/o Office of the Architect to Govt. Public Works Deptt., Fort, Bombay-1
11 K B Carnac	City Engineer, "The Cliff"	New Worli, Bombay-18
12 Choagan Lal Kataria		C/o INTUC—Madhya Pradesh Branch. Shram Shivar, Snehataganj Indore
13 T S Vedagiri (Member-Secretary)	Superintending Engineer, and Secretary, Buildings Projects Team, Committee on Plan Projects	Planning Commission, Government of India New Delhi.

THE EXECUTIVE DIRECTOR,  
NATIONAL PRODUCTIVITY COUNCIL,  
NEW DELHI.

Sir,

*We, the members of the Indian Productivity Team for Factory Buildings, Layout and Construction, forward herewith the report of our study of Factory Buildings and allied structures in Japan, the United States of America and Italy.*

*The subject of the study is a vast one—full of complexities. The time at the disposal of the team for the study of such a complex problem was short. We have, however, made an attempt to record in our Report all the salient features we have observed regarding planning, designing and construction of factory buildings and allied structures in the countries visited. We hope that our observations and recommendations would be of help to all engaged on factory construction, both in the public and private sectors. The translation of some of the recommendations into practice would lead to reduction in construction costs.*

*Yours faithfully,*

*Sd/- Sarup Singh  
,, C P Malik  
,, R M Sambamoorthy  
,, R P Mhatre  
,, M K Jadhav  
,, Jai Krishna  
,, G S Ramaswamy  
,, Mohan Singh  
,, Bhai Sunder Das  
,, Akshoy Bose  
,, K B Carnac  
,, Chagan Lal Kataria  
,, T S Vedagiri*

## Introduction

### Origin of the team

A tally made by the Committee on Plan Progress has shown that the allotment of building construction accounts for nearly a thousand crores of rupees in the tally of Rs 4,800/- in Second Five Year Plan. Roughly, a third of this amount may be attributed to factory building construction—both big and small. With the accent on industrialisation, the investment in factory building construction in the future Plans is bound to be considerably higher. In such large items of expenditure, the desirability of economy, consistent with functional efficiency is obvious. A knowledge of the experience of industrialised countries is, no doubt, useful.

It was, therefore, decided that in order to derive benefit from the experience of other industrialised countries, a team may be sent to study the subject of factory layout and construction embracing the techniques of design and execution of works, factory-made building materials and latest methods of administration and management at site.

The team set out on tour on 1st November and completed its assignment on 20th December, 1959.

### Terms of reference

The team gave attention in all their visits and discussions to the following subjects :

- (a) Broad features of modern design
- (b) Layouts
- (c) Space utilisation
- (d) Types of structures adopted
- (e) Design and material problem relating to framing, clabbing and roofing
- (f) Design problems connected with seismic forces, especially for tall structure
- (g) Adaptability for future expansion
- (h) System of lighting
- (i) Flooring
- (j) Agency for designing, tendering and construction
- (k) Building material situation in general and price-control
- (l) Wage structure and conditions of employment of labour
- (m) Special features conducive to economy and speedy construction
- (n) Standardisation and degree of pre-fabrication, and
- (o) Mechanisation and use of power-driven hand tools



## **Team organisation**

Prior to its departure, the team met once in India for laying down the lines of study and the process of collection and collation of information during the tour. Preparatory visits to industrial centres within the country were not considered necessary as the members of the team already possess adequate background of the design principles and practices adapted in the country.

## **Itinerary**

It was decided that the team should visit Japan, the United States of America and Italy. The inclusion of UK and West Germany in the itinerary provided for visits to industrial establishments, research centres, and discussions with consultants, architects and labour organisations. In all, the team visited 19 industrial establishments, seven technical and research institutions and had discussions with 16 organisations. A detailed list is given in Appendix I.

## **Limitations**

Though the main object of the study was factory layout and construction, it was considered feasible to divorce from the study the general trends in building construction. Visits to some of the building material centres, multi-storeyed buildings and teaching and research institutions proved useful in providing the necessary background for properly assessing the merits of various designs, structural techniques and organisational methods.

It is rather unfortunate that none of the itinerary in the three countries visited was received sufficiently in advance. Even for Japan, the first country that was visited, the broad itinerary was received only a day prior to the departure of the team. As a result, the team, on arrival in the country, had to ask

for some changes. Although the authorities in charge were willing to accommodate, it was not found practical to make eleventh-hour change. To enable a team to ask for necessary changes with a view to fulfilling the objects of study more effectively, it is necessary, if not essential, that itinerary should, as far as possible, be received at least a month in advance of the departure of the team.

We further found that the time available for the study of a complex problem like factory building construction was insufficient and the programme was so crowded that it was difficult to assimilate the information depending upon the nature of a pre-arranged assignment, there should not be more than one or two visits during a day. There should be suitable breaks for the drafting of notes.

## **Acknowledgments**

The members of the team are grateful to the National Productivity Council for affording them this opportunity for the study of the important subject in the three countries. The team also places on record its thanks to the International Cooperation Administration of the USA, the Japanese Productivity Council and the Council for National Productivity of Italy, who were responsible for the organisation of the tour in their respective countries. The team would specially like to express its appreciation as also for help received from Mr Leslie W Parker of the ICA, Washington, and Mr Semoto of USOM, Tokyo, who had made all arrangements for our visits. The team is thankful to the managements of the various factories, research organisations and contractors' organisations for their kindness and courtesy in supplying us all information asked for and unreservedly discussing with the members of the team problems of common interest.

The members also had an opportunity to meet the people of Japan and the USA in their homes. These contacts gave them an insight into their way of living.

#### **Layout of the Report**

As the subject of the study is vast and many-sided, the team decided, in the first instance, to divide itself into four groups, each one dealing with a specific subject, viz. (a) planning and layout, (b) design and

research, (c) materials, and (d) organisation for construction. The report of the team is accordingly divided into five chapters: the introductory chapter deals with the general background of the construction industry in the three countries visited, and the remaining four with the four subjects mentioned above. The team's conclusions and recommendations are set out at the end of the Report.