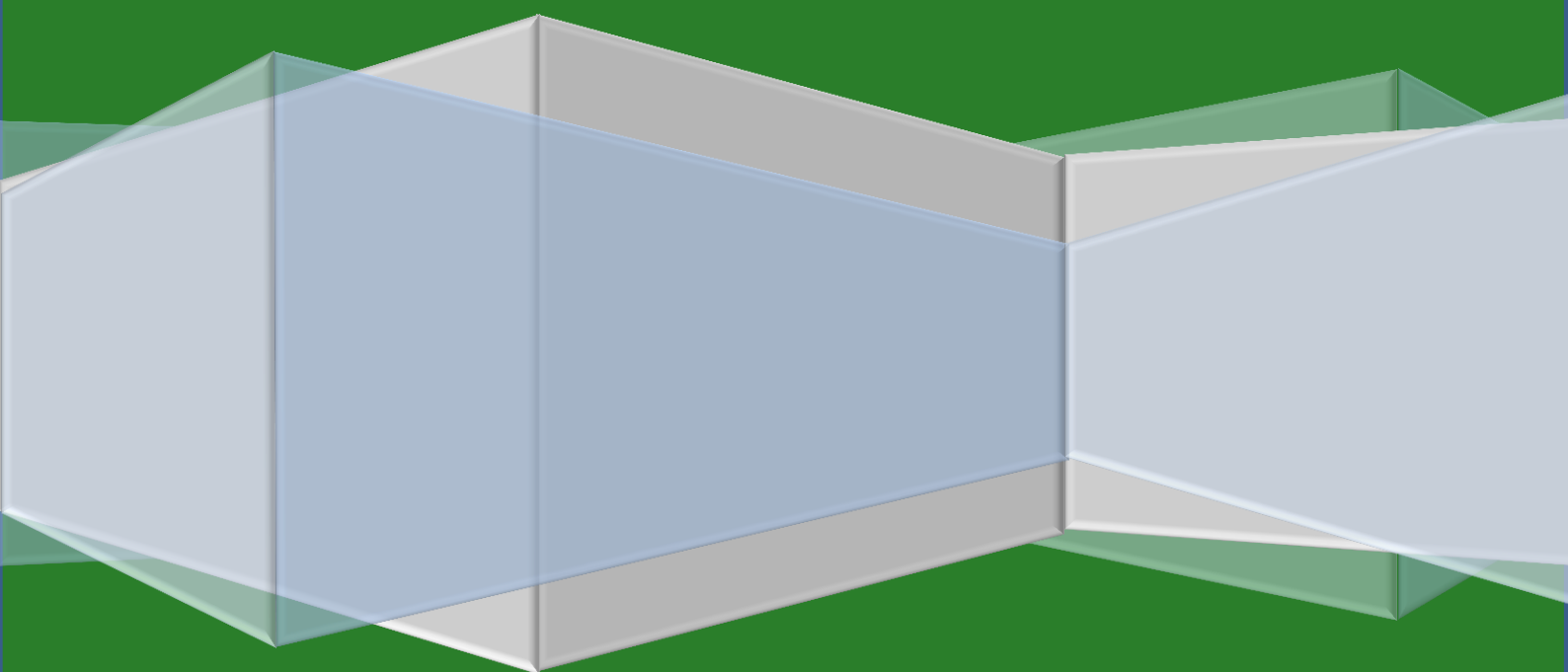


OIC ACCREDITATION CERTIFICATION PROGRAMME FOR OFFICIAL STATISTICS

# CONSTRUCTION STATISTICS

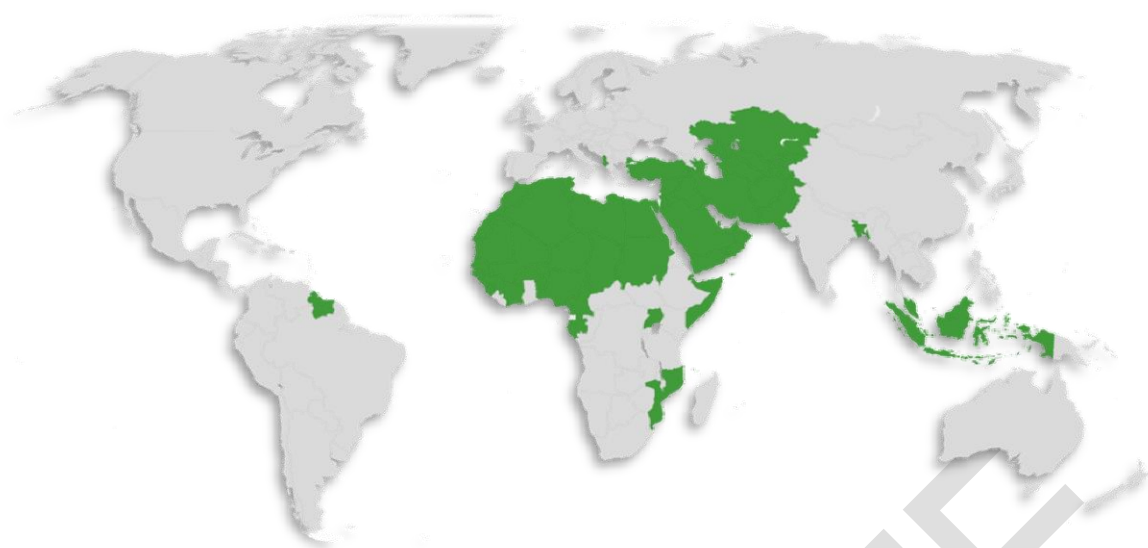
TEXTBOOK



ORGANISATION OF ISLAMIC COOPERATION

STATISTICAL ECONOMIC AND SOCIAL RESEARCH  
AND TRAINING CENTRE FOR ISLAMIC COUNTRIES





# CONSTRUCTION STATISTICS

## TEXTBOOK

{{SIVARAMAKRISHNA. V. KANTETI}}



ORGANISATION OF ISLAMIC COOPERATION

STATISTICAL ECONOMIC AND SOCIAL  
RESEARCH AND TRAINING CENTRE FOR  
ISLAMIC COUNTRIES

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## ACRONYMS

|               |                                                                                       |
|---------------|---------------------------------------------------------------------------------------|
| <b>C.I.F</b>  | Cost, insurance, and freight                                                          |
| <b>C.P.C</b>  | Central Product Classification (United Nations)                                       |
| <b>F.O.B</b>  | Free on board                                                                         |
| <b>G.C.F</b>  | Gross Capital Formation                                                               |
| <b>GDP</b>    | Gross Domestic Product                                                                |
| <b>GFCF</b>   | Gross Fixed Capital Formation                                                         |
| <b>MSME</b>   | Micro , Small and Medium Enterprises                                                  |
| <b>SME</b>    | Small, and Medium sized Enterprises                                                   |
| <b>IC</b>     | Intermediate Consumption                                                              |
| <b>ILO</b>    | International Labour Organization                                                     |
| <b>ISIC</b>   | International Standard Industrial Classification of All Economic Activities           |
| <b>ISCO</b>   | International Standard Classification of Occupations                                  |
| <b>GCF</b>    | Gross Capital Formation                                                               |
| <b>GFCF</b>   | Gross Fixed Capital Formation                                                         |
| <b>OIC</b>    | Organization of Islamic Cooperation                                                   |
| <b>OECD</b>   | Organization of Economic Cooperation and Development                                  |
| <b>SESRIC</b> | Statistical , Economic and Social Research and Training Centre for Islamic Countries, |
| <b>UNCTAD</b> | United Nations Conference on Trade and Development                                    |
| <b>UNIDO</b>  | United Nations Industrial Development Organization                                    |
| <b>UNSC</b>   | United Nations Statistical Commission                                                 |
| <b>UNSD</b>   | United Nations Statistical Division                                                   |
| <b>UNSO</b>   | United Nations Statistical Office                                                     |

## ACKNOWLEDGEMENT

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- xiii. OECD2008: Glossary of statistical terms 2008
- xiv. OECD: Paris, EUROSTAT Luxembourg, Sources and methods, construction price indices

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me back if you find any errors like misspelled words, numerical errors, incorrect statements, comprehension errors, typesetting problems or any other qualifying errors.

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## UNIT 1

### **CONSTRUCTION, ACTIVITY, INDUSTRY, ESTABLISHMENTS, ROLE OF CONSTRUCTION IN THE ECONOMY**

#### **1.1. Construction and construction activity and industry**

##### *Learning Objectives*

1. To understand the terms construction and construction activity, construction industry
2. To learn about the difference between construction activity and industry
3. To understand the subtle difference in construction and manufacturing

Construction is essentially a process of moving materials and equipment to a site for assembling them /creating/ building a structure or a facility or a system for the customer. It is undertaken on demand from a specific customer and created at his desired site/location. The word construction is derived from the word “Construction” in French. Construction is used as a noun and verb both: describing the nature of the structure, and the act of building or creating<sup>1</sup>.

Many countries view the construction as an industry where in all the construction work is done by establishment/firms whose main activity is construction itself. Thus the relevant data on the construction are collected through these units and all the construction indicators like output or gross value added, housing starts, input price index, output price index, sales' price index etc. are compiled. Most of the developed countries having large scale establishments engaged in construction subscribe this view.

Some other countries look at the construction as an activity that encompasses all construction work taken up by any unit including the establishment/ firms, also many individual households irrespective of their predominant activity. In most of the developing economies having substantial rural population, the households are highly dependent on agriculture and other farm practices for their livelihood. Their primary activity in that sense is agriculture but undertake construction activity as a part of their farm activities, mainly for their own use. If their activity is not covered, then the construction output shall get significantly under reported. With a view to include this type of construction work, the construction is viewed as an activity by these economies.

The United Nations defines construction as comprising” economic activity directed to the creation, renovation , repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature and other such engineering constructions as roads, bridges dams and so forth” <sup>3</sup>.

The United Nations also distinguish between construction activity which may be carried out by any unit irrespective of its predominant activity and the construction industry which is confined to those units whose predominant activity falls with the tabulation category F of ISIC Rev4 <sup>3</sup>.

Construction differs from manufacturing in that manufacturing generally involves mass production of similar items without a designated customer/purchaser but the construction is typically done on a specified location of the customer as per his specifications. Manufacture involves transforming the substances into new and final products.

## **1.2 Classification of the construction activity and construction subsectors**

### *Learning Objectives*

- 1 To understand the purpose of the economic activity classification system
2. To learn about the types of construction works, types of establishments engaged in

The International Standard Industrial Classification of All Economic Activities (ISIC) consists of a classification structure of all economic activities based on a set of internationally agreed concepts, definitions, principles and classification rules. The classification structure gives an international standard format to organize detailed information about the state of an economy and is useful to do economic analysis. It provides a comprehensive framework within which economic data can be collected, tabulated and disseminated. The United Nations Statistics Division (UNSD) is responsible for development and maintenance of Standard Industrial Classification of Economic Activities (ISIC). The latest version of such classification is International Standard Industrial Classification of all Economic Activities., Rev 4 (ISIC rev 4). This version is finalized by the Statistical Commission (SC) in the year 2006. Keeping in view, the need of international comparability of Economic Statistics data, like production, national income, employment, population etc., the Economic and Social Council recommends to all its member countries to follow this version of activity classification or an adjusted version of this classification by national economies. This ISIC classification groups all activities into 21 sections, 88 divisions, 238 groups and 419 classes. Annex-1 gives the structure of the ISIC Rev 4 at section level (at one digit level)<sup>2</sup>.

Figure 1 depicts the three divisions of the construction activity as shown in the ISIC Rev 4 classification namely (i) Construction of buildings (ii) Civil engineering works and (iii) specialized construction activities (special trades) for buildings or civil engineering works<sup>2</sup>.

| <b>Figure 1: Three divisions in the Construction Sector</b> |  |
|-------------------------------------------------------------|--|
| <b>Section</b>                                              |  |
| <b>F - Construction</b>                                     |  |
| <b>Divisions</b>                                            |  |
| <b>41 - Construction of buildings</b>                       |  |
|                                                             |  |
| <b>42 - Civil engineering</b>                               |  |
|                                                             |  |
| <b>43 - Specialized construction activities</b>             |  |

The first division includes the construction of complete residential and non-residential buildings. Examples are a) dwellings and associated units for dwelling units (single family, or multi family or high-rise residential buildings), b) buildings used for both dwelling and industrial purposes c) and all other non-residential buildings used for industrial purposes such as (i) stores, (ii) factory and work room, (iii) warehouse, (iv) accommodation, (v) restaurants (vi) educational purpose, (vii) hospitals, (viii) health care and welfare purpose, (ix) government offices, (x) postal offices, (xi) buildings for entertainment purposes, (xii) sports buildings, (xiii) airports, and (xiv) buildings for all other industrial uses.

The second division namely the civil engineering works includes construction of motor ways, streets, roads, highways, bridges, high way bridges, tunnels, subways, railways, airfield runways, harbours, dams, irrigation systems, other water projects, sewerage systems, complex and large projects on industrial sites like utility projects (power plants and water treatment plants), chemical plants, mining projects, long distance pipelines, electrical lines, communications, local pipelines and cables, and sports facilities etc.

The third division includes all other specialized construction activities either for buildings or for civil construction works without the responsibility of the entire projects. They include all activities specializing in one aspect common to different kind of structures

requiring specialized skills or equipment like pile driving in foundations, water proofing, damp proofing works, shaft sinking, subsurface work and work of tall structures, scaffolds and work platforms, erection of chimneys and industrial ovens, outdoor swimming pools etc. Activities that are carried out as a part of the construction process like demolition, site preparation, electrical works, plumbing, heat and air-conditioning installation activities, building completion and finishing activities, installation of elevators, escalators, automated and revolving doors, lightening conductors, vacuumed cleaning systems, thermal, sound or vibration insulations are also included in this division. Renting of construction equipment and machinery with operator is also included in the specialized construction activity<sup>2</sup>. Erection of free fabricated buildings or structures on the construction site and construction of structures on temporary nature are also included in construction. Improvement to land, water irrigation channels, and reclamation of land are included in construction activity.

There are three types of construction work as shown in the Figure 2 namely (i) all new construction, (ii) additions and alternations (iii) repair and maintenance, depending on the nature of construction work.

| <b>Figure 2: Type of construction work</b> |
|--------------------------------------------|
|                                            |
| <b>New Constructions</b>                   |
| <b>Additions and Alterations</b>           |
| <b>Repair and Maintenance</b>              |

The new construction is on a piece of land where there is no existing structure while the additions and alterations are on the premises where there is an existing structure. Additions increases the floor space constructed. In a renovation, a part of existing structure is removed and construction is carried out to create the new structure however, it won't change the use and nature of the structure. A renovation takes place when natural disasters/ calamities damage existing structure partly or fully, and new structure is built in its place<sup>4</sup>.

Repair and maintenance work includes all regular maintenance work taken up periodically to upkeep the buildings and structures. They won't change the use status of the buildings and structures.

The Construction industry includes all establishments/ firms primarily engaged in construction of buildings or engineering projects. These establishments generally undertake the construction work either on fee, or on contract basis or on own account basis. In own account construction, the establishment itself under takes the construction for the establishment itself or for another establishment which is part of the enterprise. Establishments primarily engaged in the preparation of sites for new construction and establishments primarily engaged in subdividing land for sale as building sites also are treated as construction establishments.

Construction activities of these establishments are generally administered or managed from a relatively fixed place of business, but the actual construction work is performed at one or more different sites. If a company has more than one relatively fixed place of business from which it undertakes or manages construction activities and for which separate accounts /data on the number of employees, payroll, receipts, and other establishment-type records are maintained/available, each such place of business is considered as a separate construction establishment.

Figure 3 depicts the type of establishments mainly based on the degree of responsibility they take for completion of the entire construction project.

| <b>Figure 3.: Type of establishments based on the their degree of responsibility taken up for completion of the project</b> |                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>(a) Main contractors/ prime contractors</b>                                                                              |                                                                           |
| <b>(i)</b>                                                                                                                  | <b>Main contractors for Building works</b>                                |
| <b>(ii)</b>                                                                                                                 | <b>Main contractors for Civil construction works other than buildings</b> |
| <b>(b) Special trade contractors</b>                                                                                        |                                                                           |
| <b>(i)</b>                                                                                                                  | <b>Special trade contractors for Civil projects</b>                       |
| <b>(ii)</b>                                                                                                                 | <b>Other Special trade contractors</b>                                    |

Broadly, the establishments primarily engaged in construction activities could be grouped in to two categories (i) Main contractors primarily engaged in construction (ii) special trade contractors having special skills in special construction activities. These main construction contractors usually assume responsibility for an entire construction projects. In these establishments, production responsibilities are usually specified in contracts with the owners of construction projects. But may subcontract to others all of the actual construction work or those portions of the project that require special skills or equipment. Main contractors thus may or may not have construction workers on their payrolls. Special trade contractors are primarily engaged in specialized construction activities, such as plumbing, painting, and electrical work, and thus the work for main contractors under subcontract or directly for property owners. These establishments could further be subdivided into four (4) groups depending on the nature and scale of construction work they undertake.

a(i) Main construction contractors for buildings: These are primarily engaged in the construction of dwellings and other non-residential buildings for industrial use (office buildings, stores, farm buildings, and other buildings). These establishments generally do on fee, contract basis. However, there are establishments which construct buildings on own account (for future sale or use them for their own purpose like renting them). Establishments who build on their own account for resale are classified as engaged in construction activity. However, builders who build structures on their own account for rental purpose or for utilising them for manufacturing activity are classified in to Real Estate or Manufacturing activity depending on their operations.

a(ii) Main contractors for civil engineering works other than buildings: These are primarily engaged in the construction of highways; pipelines, communications and power lines, and sewer and water mains; and other heavy construction projects.

b(i) Special trade contractors in civil engineering works other than buildings: They are primarily engaged in activities such as grading for highway and airport runways; guardrail construction; installation of highway signs; asphalt and concrete construction of roads, highways, streets and public sidewalks; trenching; cable laying; conduit construction; underwater rock removal; pipeline wrapping; or land clearing and levelling.

b(ii) Other special trade contractors: They are primarily engaged in the activities of a type that are either specialized to building construction or a specialised aspect of civil engineering works. These activities include painting (including bridge painting and

traffic lane painting) and electrical work (including work on bridges, power lines and power plants).

### 1.3 The role of the construction industry in the economy, in generation of employment and its link with the Gross Capital formation

#### *Learning Objectives*

- 1) To understand the share of the construction in the economy
- 2) To learn about the role of the construction in employment generation
- 3) To understand the relation of construction activity with the capital formation.

The Construction sector plays an important role in the economic growth of any national economy and has special linkages with other sectors of the economy. This sector takes raw materials produced in other sectors like forestry, Mining, Manufacturing sectors and services from various services sectors like Professional Scientific and technical services sector and creates the capital goods like buildings, structures, civil engineering works etc. Thus this sector influences and creates demand for the output of other sectors and strengthens the GDP of the economy as well. The statistical information on the construction sector suggests that in developed economies, the construction industry contributes around 5% to 8% of GDP where as in the developing countries, the sector contributes around 3% to 5% of the economy<sup>11</sup>.

Table 1 presents the data on percentage share of construction in GDP for the top ten ranking OIC member countries during the period 2010 to 2014. The construction share in the GDP is more than 10% in 8 among the top ten member countries. The Guyana's share is almost 10%. The construction share of Guinea (15.35%) is the largest among all the ten countries. Djibouti followed it and at second position with share of 15.17% and Azerbaijan with the share 13.45% stood at the third place. The share of the construction in GDP for Guyana and Afghanistan are relatively low (9.86 and 9.39) among the ten countries.

| <b>Table 1. Construction , Share in GDP for the top 10 ranking OIC Member Countries</b> |                      |                             |             |             |             |             |
|-----------------------------------------------------------------------------------------|----------------------|-----------------------------|-------------|-------------|-------------|-------------|
|                                                                                         |                      | <b>Value in Percentages</b> |             |             |             |             |
| <b>Rank</b>                                                                             | <b>Country/ Year</b> | <b>2010</b>                 | <b>2011</b> | <b>2012</b> | <b>2013</b> | <b>2014</b> |

| 1                                                                                                                                                                                                                                                | Guinea      | 11.59 | 11.52 | 12.68 | 13.81 | 15.35 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------|-------|-------|-------|-------|
| 2                                                                                                                                                                                                                                                | Djibouti    | 12.7  | 13.26 | 12.66 | 12.88 | 15.17 |
| 3                                                                                                                                                                                                                                                | Azerbaijan  | 8.69  | 8.45  | 10.73 | 12.64 | 13.45 |
| 4                                                                                                                                                                                                                                                | Maldives    | 9.29  | 11.4  | 11.61 | 10.28 | 12.1  |
| 5                                                                                                                                                                                                                                                | Tajikistan  | 11.41 | 8.95  | 9.41  | 11.71 | 11.63 |
| 6                                                                                                                                                                                                                                                | Albania     | 14.6  | 14.41 | 12.15 | 12.32 | 11.54 |
| 7                                                                                                                                                                                                                                                | Algeria     | 10.14 | 8.86  | 9.04  | 9.81  | 10.43 |
| 8                                                                                                                                                                                                                                                | Indonesia   | 10.29 | 10.16 | 10.26 | 9.99  | 10.14 |
| 9                                                                                                                                                                                                                                                | Guyana      | 9.99  | 9.2   | 9.59  | 8.59  | 9.86  |
| 10                                                                                                                                                                                                                                               | Afghanistan | 8.21  | 7.75  | 7.93  | 8.33  | 9.39  |
| Source: <b>Basic Social and Economic indicators data base (BASEIND) of SESRIC</b><br>data link: <a href="http://www.sesric.org/baseind.php">http://www.sesric.org/baseind.php</a><br>The figures for the year 2014 are the latest update figures |             |       |       |       |       |       |

Table 2 gives the top ten ranking OIC Member countries ranked on the basis of construction output in million USD for the year 2014, a different picture altogether is witnessed here. As far as the magnitude of the construction output is concerned, Indonesia tops the OIC member countries and followed by Turkey and Saudi Arabia. Only two countries namely Algeria and Indonesia could find place in both the tables 1 and 2 having got significant output and simultaneously got more than 10% share of construction in their GDP.

| Table 2: Construction output for the top 10 ranking OIC Member countries |                      |                    |                              |                                         |
|--------------------------------------------------------------------------|----------------------|--------------------|------------------------------|-----------------------------------------|
| Rank                                                                     | Country              | GDP in million USD | Construction in million USD* | Percentage Share of Construction in GDP |
| 1                                                                        | Indonesia            | 888538             | 9009777                      | 10.14                                   |
| 2                                                                        | Turkey               | 798414             | 4095863                      | 5.13                                    |
| 3                                                                        | Saudi Arabia         | 752460             | 4063282                      | 5.40                                    |
| 4                                                                        | Iran                 | 425326             | 3717350                      | 8.74                                    |
| 5                                                                        | United Arab Emirates | 399451             | 3411314                      | 8.54                                    |
| 6                                                                        | Algeria              | 213518             | 2226997                      | 10.43                                   |
| 7                                                                        | Nigeria              | 568499             | 2035226                      | 3.58                                    |
| 8                                                                        | Iraq                 | 225422             | 1749271                      | 7.76                                    |
| 9                                                                        | Malaysia             | 326933             | 1445046                      | 4.42                                    |
| 10                                                                       | Kazakhstan           | 216036             | 1395594                      | 6.46                                    |
| Source: BASEIND of SESRIC data                                           |                      |                    |                              |                                         |

base

\* derived

Table 3 depicts the importance of the construction as a source of employment generation. The share of construction employment in the total employment is given for four selected OIC member countries in the table. These four countries are selected as they are located in different geographical regions and the requisite data is available from the ILO laborsta data base. (OIC SESRIC data base gives the employment for Industry as whole (Mining, Manufacturing, Utilities and Construction) and separate employment in construction sector is not available. The ILO laborsta data base also gives employment figures for different reference years (in fact the employment figure is mostly based on Labour force surveys which are conducted in different years in different countries). With this restricted availability of data, the role of construction sector in the total employment for all OIC member countries for one uniform year could not be studied).

| <b>Table 3 : Share of Employment of Construction in the total Employment of selected OIC Member Countries</b> |                                                         |                                                        |                                                                                |                                  |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------|
| <b>Country</b>                                                                                                | <b>Total Paid employment in 000s in all activities@</b> | <b>Paid employment in construction sector in 000s@</b> | <b>Percentage (%) share of construction employment in the total employment</b> | <b>Year /classification used</b> |
| <b>Bahrain</b>                                                                                                | <b>431.19</b>                                           | <b>128.75</b>                                          | <b>29.86</b>                                                                   | 2008, ISIC3                      |
| <b>Egypt</b>                                                                                                  | <b>12715.1</b>                                          | <b>1470.5</b>                                          | <b>11.56</b>                                                                   | 2007, ISIC 3                     |
| <b>Azerbaijan</b>                                                                                             | <b>1719.3</b>                                           | <b>181.8</b>                                           | <b>10.57</b>                                                                   | 2008, ISIC3                      |
| <b>Turkey</b>                                                                                                 | <b>12937</b>                                            | <b>1002</b>                                            | <b>7.75</b>                                                                    | 2008, ISIC 3                     |

**Notes:**

For the country Azerbaijan, the employment is of 2008 LFS,

For the country Bahrain, the employment is of 2008 LFS,

For the country Egypt, the employment is of 2007 LFS,

For the country Turkey, the employment is of 2008 LFS

\* For all economic activities

**Source:**

**International Labor Organization data base on occupational injuries**

<http://laborsta.ilo.org>

The share of the employment in construction varies from 8% to 30%. Among the four countries, Bahrain got the highest share of employment in the construction sector.

Relationship of construction with GDP in expenditure approach:

Capital assets are those assets (both tangible and intangible produced assets) having more than one year life and are further used repeatedly in further production of goods and services. Buildings and Structures which are the new current output of the construction sector are also capital assets. As discussed above, the construction output is from both the (i) new constructions, additions and alterations and (ii) from the repair and maintenance. The new construction output including the Land development done during the reference year, in the nature of capital assets, is taken as one component of the Gross Fixed Capital Formation (GFCF). The other component of GFCF is the value of net acquisition of machinery and equipment. Construction output from the Minor repair and maintenance work is not considered as capital asset and thus does not form part of the Gross Fixed Capital formation. Gross capital formation (GCF) is the sum total of GFCF, change in Inventories and valuables. The GCF is an important component of GDP when viewed / compiled through the expenditure approach. The GDP is also compiled through the expenditure approach. The components of the GDP in this approach are (i) Final consumption Expenditure (ii) Gross capital formation and (iii) exports less imports. Thus, the share of GCF as a percentage of GDP could be seen as a measure of capital expenditure on capital goods which are used in future production in the economy. Further, the proportion of GCF out of the total construction output could be also a proxy indicator for the produced fixed assets. This highlights the importance of the construction sector in creating the Capital goods. In this way, the dual role of the construction sector is witnessed in compilation of GDP, once as a

contributing sector to GDP directly while compiling it through the production approach and other as a component of Expenditure item (as part of in GDP through the component of GCF) while compiling through expenditure approach.

|                 |                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------|
| <b>Table 4:</b> | <b>GFCF , its Share in GDP for the some of the OIC Member countries during the year 2013</b> |
|-----------------|----------------------------------------------------------------------------------------------|

| Country    | GDP at Current Prices, US\$ millions | Real GDP growth rate yoy in % | GDP per capita US\$ | Construction as% of GDP | G C F as % of GDP | *Construction per capita US\$ | GCF as percentage of Construction output |
|------------|--------------------------------------|-------------------------------|---------------------|-------------------------|-------------------|-------------------------------|------------------------------------------|
| Algeria    | 208764                               | 2.8                           | 5325                | 9.81                    | 43.3              | 522.38                        | 4.41                                     |
| Indonesia  | 868346                               | 5.78                          | 3475                | 9.99                    | 33.6              | 347.15                        | 3.36                                     |
| Uganda     | 26444                                | 4.51                          | 704                 | 8.46                    | 28.9              | 59.56                         | 3.42                                     |
| Azerbaijan | 73557                                | 5.99                          | 7814                | 12.64                   | 24.7              | 987.69                        | 1.95                                     |
| Albania    | 12904                                | 1.3                           | 4066                | 12.32                   | 24.2              | 500.93                        | 1.96                                     |
| UAE        | 402340                               | 5.2                           | 43049               | 8.61                    | 22.6              | 3706.52                       | 2.62                                     |

Source: UNCTAD Statistics  
data link: <http://unctadstat.unctad.org>  
GDP is gross domestic product, US\$ : United States dollar  
GCF is gross capital formation (GFCF+ change in Inventories + Valuables)  
\*Derived.

Table 4 shows the share of the construction and GCF as percentage of GDP for 6 OIC member countries for the year 2013. The first three data columns are shown to indicate the relative size of the economy in terms of GDP, year on year growth rate in the real GDP, and per capita GDP. The fourth and fifth columns give normalized comparable data. The last two columns are derived ones and give the per capita measure of gross value added in construction sector and percentage share of GCF in the construction output. In the year 2013, construction as percentage of GDP is relatively high for Azerbaijan and Albania (12.64 and 12.32) but the share of GCF is

high (43.3, 33.6) for Algeria and Indonesia indicating the relatively high degree of capital expenditure on production of capital goods in these two countries. Among all the six countries for which the data is available, the per capita construction is very high in UAE.

## UNIT 2

### **Classification of construction activities, establishments using the top down approach and its links with other sectors**

#### **2.1 Classification of activities using the top down approach**

##### *Learning Objectives*

1. To understand the concept of classification and the top down approach
2. To learn about it with more examples

While classifying the establishments into construction Section or into other sections of ISIC classification, care should be taken in deciding the economic activity undertaken and classifying the establishment to the respective sector. Special care should be taken while preparing the list frame of the units / business register or while conducting the sample surveys.

If more than one activity is carried out by an establishment or an operating unit and separate information is available for each activity, then each of such activity is to be treated as separate establishment and the establishment is thus classified into that sector of activity. If separate information is not available, then the major activity of the establishment is to be decided based on 'top down approach' using one of the criteria (i) turnover, or (ii) value added, or (iii) employment during the reference year and thereafter the establishment is classified as engaged in that major economic activity<sup>5</sup>. Proper classification avoids over reporting or under reporting of construction activity. The following examples illustrate clearly the concept.

Consider a simple case of an establishment engaged in two activities, one is manufacturing and the other one is construction. The GVA share of manufacturing is 45% and the GVA share of trading is 55%. The establishment is to be classified as engaged in construction activity as its GVA share is higher in it (55%) at section (first digit level) of ISIC classification.

Box 1 illustrates using of the top down approach and selecting the major economic activity of the establishment up to the 4 th digit level (Class) of ISIC classification. An

establishment is carrying out nine activities as given in the box. The respective share of GVA and description of the activities at class (four digit) level are also recorded.

Box: 1 : Example: Identifying the principal activity of a unit using the top-down method

| Section | Division | Group | Class | Description of the class                                             | GVA% |  |
|---------|----------|-------|-------|----------------------------------------------------------------------|------|--|
| 2       | 25       | 251   | 2512  | Manufacture of tanks, reservoirs and containers of metal             | 7    |  |
| 2       | 28       | 281   | 2816  | Manufacture of lifting and handling equipment                        | 8    |  |
| 2       | 28       | 282   | 2821  | Manufacture of agricultural and forestry machinery                   | 3    |  |
| 2       | 28       | 282   | 2822  | Manufacture of metal-forming machinery and machine tools             | 21   |  |
| 2       | 28       | 282   | 2824  | 2824 Manufacture of machinery for mining, quarrying and construction | 8    |  |
| 2       | 29       | 293   | 2930  | Manufacture of parts and accessories for motor vehicles              | 5    |  |
| 4       | 46       | 461   | 4610  | Wholesale on a fee or contract basis                                 | 7    |  |
| 4       | 46       | 465   | 4659  | Wholesale of other machinery and equipment                           | 28   |  |
| 7       | 71       | 711   | 7110  | architectural and engineering and related Technical consultancy      | 13   |  |

**Total GVA** 100

**Selection of Major economic activity of the establishment using the top down approach**

**Step1: Selection of Major Economic activity Section**

Section wise share

in GVA C= 52 , G= 35 M = 13

So Major Economic activity Section is C

**Step 2 : Selection of Major economic activity Division within the section**

Division wise share in GVA ( within the Section C)

division 25= 7 , division 28= 40 , division 29= 5

So major economic activity division within the section C is division 28

**Step 3 : Selection of Major economic activity group within the division**

Group wise GVA shares are Group 281 =8, Group 282 = 32

So Major economic activity group within the section C, and division 28 is Group 282

**Step 4 : Selection of Major economic activity Class within the group**

Class wise shares of GVA within the group 282 are class 2821 =3, class 2822 =21, and class 2824= 8

**So Major economic activity class within the Group 282 is Class 2822**

**So the reporting unit/ establishment is categorized as an establishment engaged in Manufacture of metal forming equipment and machine tools.**

Another example is also given below for more clarity on use of the top down approach. The example is taken from the UNSD publication, series M on economic activities.

A trading establishment is engaged in 8 economic activities as depicted in the following Box 2.

Box: 2 Example: Identifying the principal activity of a unit using the top-down method

| Section | Division | group | class | Description of the class                                        | Share of GVA in % |
|---------|----------|-------|-------|-----------------------------------------------------------------|-------------------|
| G       | 46       | 465   | 4651  | Wholesale sale of computers                                     | 10                |
| G       | 47       | 474   | 4741  | Retail sale of computers in specialized stores                  | 8                 |
| G       | 47       | 474   | 4742  | Retails sale of audio and video equipment in specialized stores | 15                |
| G       | 47       | 475   | 4759  | Retail sale of electrical household items in specialized stores | 4                 |
| G       | 47       | 476   | 4761  | Retail sale of books in specialized stores                      | 3                 |
| G       | 47       | 476   | 4762  | Retail sale of music and video tapes in specialized stores      | 12                |
| G       | 47       | 479   | 4791  | Retail sale via mail orders                                     | 35                |
| N       | 77       | 772   | 7722  | Renting of video tapes                                          | 13                |

It may be noted that the trading establishment is also engaged in Section N (Administration and support services). In the top down approach, the major economic activity is to be decided at section level first, then at division level within the major

section, and there after within the group level within the division etc. Here in the example at group level, one more distinction is made (retail trade having specialized stores and no specialized stores). The major economic activity at group level is also to be decided based on having specialized stores or not. Finally the major economic activity class within the major group is to be selected. The steps are as given below.

Between the sections G and N

The share of the GVA of the G section is 87

The share of GVA of section N is 13, so Section G is the major activity section

Within the section G,

The share of the GVA of division 46 is 10 and that of division 47 is 77. So the major economic activity division is 47 (retail trade) within the Division 47

The share of the GVA of group 474 is 23, of 475 is 4, of 476 is 15 and of 479 is 35. But the three groups namely 474, 475 and 476 are with specialized stores. Only one group 479 is a non-specialized one. So GVA share of the groups 474, 475 and 476 together is 42 and that of 479 is only 35. The major economic activity is of specialized stores (among 474 to 477 groups).

Within the groups 474 to 477, the major economic activity group is 474 with GVA share of 23, and the major economic activity class within the 474 group is 4742 class with 15 GVA share. Thus the establishment is finally to be classified as retail trading establishment dealing with retail sale in audio and video equipment in specialized stores<sup>5</sup>.

## **2.2 Links of construction sector with other sectors of the economy**

### *Learning objectives*

#### *1. To understand the links between the construction sector and with other sectors*

There are establishments which are primarily engaged in some business other than construction but they also engaged in construction activity as incidental to their primary activity, using the services of their own employees for its own account and use. These establishments are not to be included in construction industry, but are to be classified according to their usual primary activity. This is the general rule to be followed.

Emphasis should be made on primary activity. For example, if a trading establishment engaged in selling household appliances does the installation work in the premises of its customer, as a service incidental to its trade activity, is not classified as construction establishment but as a trading establishment.

However, if an enterprise has got more than one establishment, and the construction work for the enterprise's own use was undertaken by one of the establishments as its primary activity that establishment is included as construction establishment.

### Construction and Mining & Quarrying industry

- a) Establishments primarily engaged in contracting for test drilling, excavating of galleries or pits, well drilling, and earth removing for the purpose of excavating and quarrying minerals, (such as metals, non-metals, coal, oil, natural gas) are classified as engaged in Mining support service activities (0990) under Mining and Quarrying sector and not in construction (looking at their primary activity).
- b) Establishments engaged in drilling of production of oil or gas wells are classified as engaged in Extraction of crude petroleum and natural gas (0610 or 0620) in Mining and quarrying activity
- c) Establishments engaged in site preparation for mining operations (except oil and gas sites) is included in construction (4310) looking at their primary activity.

### Construction and manufacturing industry

- d) Erection of complete prefabricated constructions from self-manufactured parts not of concrete (either wood products or metal fabricated products) are not treated as construction but of manufacturing activity (16 or 25 divisions).
- e) Establishments engaged in installation of industrial machinery are treated as engaged in Repair and installation of machinery and equipment (3320) in Manufacturing section (C).
- f) In cases where establishments engaged in the production and or sales of construction materials or other products are also conducting the construction work (excluding the installing, dismantling or transferring of mechanical installations) using their own products or purchased products, they will be classified as engaged in "Manufacturing," "Wholesale trade," as the case may be, according to the type of their major operations/activity.

### Construction and services industries

- a) Work-site offices and civil engineering offices and the like of the Federal, State and Local public Organizations, except ones that primarily conduct self-

construction work are classified as engaged in Professional, Scientific and technical activities. (7110)

- b) Establishments primarily engaged in managing construction projects for others on a contract or fee basis, but assuming no responsibility for completion of the construction project, like architectural and engineering activities, project management activities are classified in to the Services sector ( Professional, scientific and technical activities).
- c) Establishments primarily engaged in planning, researching, surveying, designing, supervising and the like for construction work are not included in construction but in services.
- d) Renting of construction machinery like cranes etc with operator are included in construction but renting of other construction equipment and machinery without operator are not included but treated as engaged in section (N). of Administrative and support service activities ( 7730)
- e) The establishments that employ workers for themselves, and develop building projects for sale (construct buildings and houses and sell them in parcels) are classified as engaged in Construction but if they operate the buildings themselves like renting the constructed buildings/rooms, then they are treated as engaged in Real Estate Activity (68).
- f) while the establishments that employ workers for themselves to develop the land, land sub divisions with land development and sell them in parcels are classified as engaged in construction
- g) Establishments primarily engaged in surveying, or Consulting, designing, or supervising related to construction work, are classified as engaged in Professional, Scientific and technical activities. (7110).

The Department of Labour in USA, follows the following conventions in classifying the establishments<sup>7</sup>.

1. Establishments primarily engaged in the sale and installation of the following types of structures or integral parts of structures generally assembled at site, are classified in construction rather than in trade:
  - a). Steel work on bridges or buildings; b). Elevators and escalators; c). Sprinkler systems; d). Central air-conditioning and heating equipment; e). Communications equipment; and f). Insulation materials.

2. Establishments primarily engaged in the sale and installation of the following types of pre -assembled equipment are classified in trade rather than in construction:
- a). Major household appliances, such as refrigerators, dishwashers, clothes washers and dryers, stoves and ranges; and b). Partitions for banks, stores, and restaurants.

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### UNIT 3

#### Data collection in the construction sector

### **3.1 Requirement of specific data , collection of data and quality dimensions**

#### *Learning Objectives*

1. To understand the requirement of the data on the sector
2. To understand about the standard practices to be followed while collecting the data
3. To learn about the data quality dimensions

Sound data base on various items for the construction sector are essential for effective policy formulation at the industry and national level. Further, comprehensive data is required for controlling the flow of both private and public investments into this sector. Introduction of state – of – the art technology in the complex operations of the construction , planning for and use of sophisticated capital equipment and robot based technologies to design, to create and to complete high rise multi storied buildings and complex construction projects like laying the oil and gas pipeline to transport the oil and gas on the sea bed and construction the cause ways across the sea or elevated highways needs reliable data base both at entrepreneur level and industry/economy level.

#### **Collection of data**

The data is generally collected either from establishments engaged in or from the employers or from administrative agencies. For this purpose, construction establishments, contractors/subcontractors / managers of establishments engaged in construction sector need to be registered with an authorized agency. For some of the data items related to employment and occupational accidents, injuries and illnesses, data are collected through labor force surveys, Insurance agencies and health and safety regulative agencies.

Data is generally collected through regular surveys/ periodical returns. It needs to be collected in prescribed formats/questionnaires as per the time schedule and at periodic intervals (annual, quarterly and monthly).

While collecting and compiling the aggregates and disseminating the data on the construction sector, international recommendations for industrial statistics as given in IRIS 2008 need to be followed to enable the international comparability of data on the economic activities.

The International Standard Industrial Classification of All Economic Activities (ISIC) consists of a classification structure of all economic activities based on a set of internationally agreed concepts, definitions, principles and classification rules. The classification structure gives an international standard format to organize detailed information about the state of an economy and useful to do economic analysis. It provides a comprehensive framework within which economic data can be collected, tabulated and disseminated.

Standard international activity classification (ISIC Rev 4) as suggested by the UNSD or a customized version prepared and adopted by the national economies need to be

followed while classifying the establishments into different industries. This reduces the bias (under estimation or over estimation) in estimation of sector wise indicators. The ISIC rev 4 was released on 11<sup>th</sup> August 2008 and was in operation from that date.

The Central Product Classification (CPC) consists of a coherent classification structure of all products (goods and services) based on a set of internationally agreed concepts, definitions, principles and classification rules. It is intended to serve as an international standard for collecting, aggregating and disseminating all kinds of data requiring product details, especially in industrial production, national accounts, service industries, domestic and foreign commodity trade, international trade in services, balance of payments, consumption and price statistics. This provides a framework for international comparison and promote harmonization of various types of statistics dealing with goods and services.

The CPC ver 2 was completed as on 31 Dec 2008 and was in operation. The CPC ver 2.1 was released on 11<sup>th</sup> August 2015 and was in operation. The annex- 2 gives the CPC ver 2.1 at single digit (section) level. Product classification as suggested in the CPC ver 2.1 or a customized and adopted version by the national economies need to be followed to have international comparability of products (goods and services) on production, trade and consumption.

The classification of types of constructions (CC) consists of a coherent and consistent classification structure of all constructions by their type. It is developed based on internationally agreed principles, standards and classification rules, by EUROSTAT on the basis of the CPC product classification published in 1991 by the United Nations. The classification is based mainly on the use (residential and nonresidential) for buildings and based on the purpose for the civil works (road structures, water works etc.). It consists of 2 sections, 6 divisions, 20 groups and 46 classes. It is useful to understand the statistics on construction activities, construction reports, and price statistics on construction work. It is also useful for developing the short term construction indices like input price index, output price index, sellers 'price index, housing starts etc. Annex-3 gives the three levels of the construction type classification.

### Occupational classification of Construction workers

For proper classification and aggregation of data collected from Establishment censuses and surveys, and for international comparison of labour statistics, the International Labour Organisation (ILO) recommends to all the national economies to follow the International Standard Classification of Occupations (ISCO) or the ones reconstructed, developed and adopted versions of the country's classifications. The latest version of ISCO is ISCO-08. This was approved by the United Nations Statistical Commission at its 39<sup>th</sup> session in February 2008. This classification with four level higherarchial structure allows all jobs to be classified based on the skill level and skill specialisation required for the jobs, into 436 unit groups, 130 minor

groups, 43 sub major groups and 10 major groups. Most of the Construction workers do get classified in three out of the ten major group occupations.

Occupational classification as suggested by ILO in the ISCO-08 or the adjusted and adopted classification by the national economies need to be followed to have international comparability of occupational incomes, working hours, rates related accidents, fatal and non - fatal injuries. Annex -4 gives the ISCO -08 classification at major group and sub major group level.

The five dimensions of the quality namely (i) assurances of integrity, (ii) methodological soundness, (iii) accuracy and reliability, (iv) serviceability, and (v) accessibility, as suggested by the IMF through its data quality frame work, need to be followed at all stages of collection, processing and dissemination of data<sup>18</sup>.

### **3.2 Important data items and Occupational categories of employment in construction sector**

#### *Learning Objectives*

- 1.to understand about the general data items in the construction sector
2. to know about the specific data items required in the construction sector.
3. Occupational categories of the employment commonly found in the sector

General data items for the construction sector need to be collected are:

- a) General industrial statistics (like number of establishments, employment, emoluments paid, production, stocks, dispatches, sale prices, details of materials consumed in the operations etc. Stock of fixed assets, depreciation and gross fixed capital formation, etc.).
- b) Detailed Employment statistics for both these sectors is another important set of statistics to be collected. Information on employment with breakup of (i) all employees, (ii) production and non-supervisory employees, (iii) Employees by their membership status with unions and representation, (iv) by employee occupational category and (v) with gender breakup.
- c) Data on job positions (i) openings, (ii) number of hires and (iii) separations.
- d) Detailed Information on occupational hazards and injuries. The importance of these occupational accidents, injuries and illness is given in succeeding paragraphs in Unit 5.
- e) Input prices, Output prices and Sellers prices for final products.
- f) Data on employee earnings and number of hours worked by occupational groups.
- g) Total Employer compensation costs with the break up: wages and salaries, insurance, retirement and other benefits.

Data on the following specific items relating to the construction sector need to be collected at frequent intervals

Information on the construction output by type of product category and by type of structure, by type of use needs to be collected.

- h) Type of buildings (dwelling, partly for dwelling and partly for industrial use, fully industrial use)
- i) Type of structures (wooden, steel frame reinforced concrete (SRC), Reinforced concrete (RC) etc)
- j) By type of uses (used for office, store, warehouse and cold store, factory, school, hospital etc.

About the establishments / contractors

- 1) No of establishments involved in construction contracting activity.
- 2) Main contractors, subcontractors, with license, classified by size – in terms of amount of contracts that could be undertaken or in terms of previous experience , specialised trades contractors
- 3) Number of Contractors without license (non-license holders),

Data on orders and amount of work done

- 1) Number of orders received,
- 2) amount of orders undertaken ,
- 3) value of completed construction work,
- 4) value of not completed work,
- 5) not started work,
- 6) orders from public sector or private sector,

Important input items, quantity utilised, expenses incurred on selected inputs and other important services are also to be collected. The above said information is to be collected periodically (monthly, quarterly or annually)

Some of the occupational employee categories commonly known in the construction sector are listed below<sup>8</sup>.

A: For construction sector

- i. Production employees and non- supervisory employees
- ii. supervisors and managers of construction workers,
- iii. operating engineers and other equipment operators,
- iv. truck drivers, heavy and tractor trailer

The following categories are some important trades of the skilled labor engaged in Construction.

- a) Concrete placers and finishers
- b) Plumbers and pipe fitters
- c) Carpenters and joiners
- d) Machine Operators, and assemblers
- e) Welders and flame cutters
- f) Millwrights
- g) HVAC Technicians
- h) Electrical and electronics trade workers
- i) Painters and related workers
- j) Other Construction laborers

## UNIT 4

### Compilation of Construction statistics and short term indicators

#### 4.1 compilation of various statistics relating to the Construction

##### *Learning Objectives*

- 1.To understand various general statistics to be compiled in the construction sector
2. To know about the compilation of output and GVA

From the data as specified in the previous paragraphs on construction, collected from the establishments and other regulatory agencies in the construction industry, a wide variety of reliable statistics are prepared like the estimates of final products produced in the industry by type, value of the output, statistics of various inputs utilized and the structure of input costs, value of the work in progress of the construction products by type are compiled. Estimates of Fixed capital formation, stock of capital equipment being utilized, estimates of useful life of capital equipment being used in the construction industry by type of capital asset, estimates of depreciation for each type of capital asset used, need to be compiled/ prepared.

The estimates of current assets and current liabilities, estimates of working capital, estimates of other receipts and other expenses, estimates of indirect taxes and subsidies on production are compiled.

Employment statistics by occupational category, labor costs, labor turnover, working days, man days worked, estimates of absenteeism, worker earnings, social security benefits need to be compiled. Especially, with the data on earnings and weekly hours worked, average hourly earnings, average weekly earnings and average weekly hours are compiled to study the monthly/ annual trends. Mean wages and median wages paid to different occupational groups are also compiled and studied. Estimates of the employer compensation costs give the quarterly /annual trends in compensations costs. The compensation costs for unionized employee groups or union representatives, separately, could also be compiled to see the period trends in them.

Statistics of occupational accidents etc. are compiled. Further details of the need of reliable statistics on occupational accidents, injuries and illnesses are given in unit 5. Further, price statistics, and various price indices are also to be compiled.

The above statistics are first derived for each establishment and there after aggregated to arrive at the estimates of the construction sector. If sample surveys are used then the sample estimates of output, gross value added etc. are expanded for the entire sector using appropriate multipliers based on the sampling design.

Output in the construction sector is the value of the products produced by all the construction establishments that are available for use by others outside the

establishments. They are generally valued at market prices. Output is normally measured from the perspective of producers, thus the revenues received by all the contractors for the (i) new construction and (ii) repair and maintenance work done for the existing structures during the reference period, forms the output in the construction industry. The output is normally recorded once the production is completed. But in construction industry, the production process takes generally more than one accounting period to produce the units, then the work in progress must also be added in the output. Thus the valuation of work in progress is very much essential and an important task in the construction industry.

The output for the construction establishments is generally arrived as the sum of the components (i) Sales net of returns and sale taxes (+) (ii) Goods bought for resale if any (-) (iii) Change in inventory of finished and semi- finished goods.

The intermediate consumption (IC) is the cost of goods and services entirely used up in construction process to produce the construction output during the reference period. IC excludes other production costs like labor costs, financial costs and production taxes. The intermediate consumption is arrived as the sum of the components (i) Materials used in construction (ii) Services used in construction

Gross value added (GVA) for the construction activity is arrived at by deducting the intermediate consumption (IC) incurred by the construction establishments in the construction process from the output of the establishments.

Look at the following simple example. The figures relate to all construction establishments engaged in the construction activity, output and intermediate consumption is counted without duplication (in the activities of the main contractors and subcontractors).

- (I) the output of all establishments in the construction industry is 1000 national currency units
- (II) the material costs incurred is 300 national currency units
- (III) Service costs incurred is 100 national currency units.

Then the intermediate consumption is given as  $300+100=400$  and the GVA in the construction industry is obtained as  $1000-400 = 600$ .

As most of the construction establishments are corporations, the estimates of output, intermediate consumption, and value added could be obtained by studying their books of accounts. The value added estimate could also be compiled using the income approach. The gross value added by income approach (income components that make up the gross value added) could be obtained. The gross value added can also be computed by adding together the components of value added. The GVA includes (i) compensation of employees, (ii) Other taxes less subsidies on production, (iii) consumption of fixed capital and (iv) operating surplus. In business accounts, the consumption of fixed capital is not available but the estimate of depreciation is available. That could be used as proxy. The gross operating surplus of the corporate enterprises be estimated by adding the following components

- i. Additions to the retained earnings (+)
- ii. Depreciation and depletion (+)
- iii. Bad debt allowance (+)
- iv. Property income payable less the property income receivable(+)
- v. Current transfers payable less the current transfers receivable (+)
- vi. the gains (net of loss) on sales on fixed assets and securities (-).

The gross operating surplus compiled as said above, could be used in compilation of GVA and this estimate is checked with the GVA estimate arrived at by production approach (output – IC) for consistency.

However, when the books of accounts are not available for small size establishments and for informal units, estimates of gross value added and other aggregates are to be obtained from the available current output information by applying suitable ratios which are compiled from other sample surveys on the establishments of similar nature (size, production process/ technology, and similar products).

In practice, different methods are used to arrive at the output of the construction industry by different economies. Expenditure method and commodity flow methods are two methods widely used.

#### Commodity flow method

Some countries follow the commodity flow method to estimate the output of the construction sector. It includes all the construction activity done by both the contractor/ establishments and individual households. In this method, output is arrived as the sum of materials costs and gross value added.

Construction materials come from either domestic production or from imports. The domestic materials are mainly from agricultural products, such as, bamboo and wood, mining and quarrying products, such as sand, stone, asphalt, etc.; and manufacturing products of construction materials such as cement, steel, fabricated steel structures, plastic products and paints and other chemical products. The construction materials from imports are usually the products of manufacturing industry of other economy.

A limited number of basic materials (or groups of materials) that are used in construction activity are identified and the amount of these materials in volume terms which have gone into the construction activity are estimated and their financial value is arrived at. Suitable amount of transport margins, and trade margins are included. Estimated ratios related to basic materials to other materials, total materials costs to GVA, Output to GFCF are obtained from various sample surveys of construction establishments and utilised in compilation of various aggregates from the total value of materials.

In India, the following 5 serially listed groups of materials are used as basic construction materials.

- 1.Cement and cement products
- 2.Bricks and tiles
- 3.Fixtures and Fittings
- 4.Timber and Round Wood and wood products
5. Iron and Steel products used
6. Other construction materials used

The item at sl no 6 namely “Other construction materials used” is another component of total materials consumed in construction. Using the ratio (collected from earlier surveys) between the value of basic materials and ‘all other materials used in construction’, the value of “other materials” is obtained. This includes all materials and services used in construction. Here, materials also include the small machinery and equipment namely wooden, steel structures and other fittings that go into the construction process.

For each item of input material within the group, data on quantity produced, exports, imports, Net availability of material for use in construction, trade and transport margins, other indirect taxes involved, its purchasers price at site level concerned price indexes, wage indices of mason, carpenters and other skill construction workers, unskilled constructions workers, etc., are obtained. Using this information appropriately, the purchaser’s value of the input at the construction site is obtained.

From earlier surveys on construction establishments, the estimates on percentage contribution of each material group in the total construction materials are obtained. These percentages are used as the weights in obtaining the total input expenditure. Thus the total expenditure on material inputs for the construction is arrived at.

Labour input for each type of construction activity, data steel and cement despatches from the producers, quantity and price data, proportion of employment in construction, wages for construction workers, are some of the other important items regularly collected for compilation construction indicators.

The net availability of the item is obtained as production of a raw material item – use in other industries- exports+ imports+ changes in stocks. Total Output is arrived as the sum of all materials and service costs involved in the construction and the GVA.

## Expenditure Method

The institutional sectors (corporates, general government, non-profit organisations serving the households, and the household sector) and subsectors within them, that demanded for the construction activity during the year are first identified. The budget layouts for the construction and expenditure booked against the budgeted amounts during the year for each institutional sector/ subsectors are obtained. Further, details on the amount of expenditures incurred on each type of construction (new construction, repair and maintenance) and for each type of construction product (residential, non-residential buildings, transport infrastructure, pipelines, communication and electricity lines etc, with as many sublevels as possible) are obtained. By aggregating the expenditures all the institutional sub sectors/sectors one can arrive at the total output of the economy. This method works very well when the construction activity in the economy is taken up by the registered construction contractors/establishments agents/firms and no other individual unit or households undertake construction on its own or the share of own account construction activity is negligible or comparatively small. However, the estimates of output etc. do suffer to the extent of non-availability of data from the sources.

### 4.2 compilation of various short term indicators in construction sector

#### *Learning Objectives*

- 1.To understand various short term indicators compiled in the construction sector
2. To know about the compilation of construction input, output indices

Short term Indicators for construction sector could be grouped into two groups. First group refers to the construction work done (work completed /final product created, work in progress /getting ready etc.) and the other group refers to the future construction work (like building permits, housing starts and completions etc).

Output of the construction, and gross value added made during the reference period fall into the first category of indicators and building permits, housing starts and housing/ building completions etc. fall into second group. These are some of the indicators one wishes to compile to monitor the growth rates and to know about the quarterly and annual changes for formulation of sound national policies. The output and gross value added concepts and compilation are already discussed in details in unit 4.1. The other short term indicators are discussed in the succeeding paragraphs.

**Building permits:** The building permit refers to the permission issued to start the construction work of either residential building or non -residential buildings (hotels, office buildings, industrial buildings etc.) as requested for. It is the final authorisation letter to start the construction work of the concrete building proposed. It is granted generally by the municipal authority or any other public authority assigned with the task, in response to a written request submitted along with the building plan. In some countries, construction permits are also issued for civil engineering projects by the appropriate authority. Different countries follow different procedures and set of rules for issue of these building permits. However, permit does not create any obligation to start the construction work immediately.

Building permits is a leading indicator. It is an indicator reflecting possible future activity. It indicates some information on the workload of the construction industry in the near future<sup>3</sup>. There are two indices compiled on these permits data. (i) Dwelling index and (ii) Floor area index. The dwelling index gives the number of dwellings and covers one dwelling residential buildings and two or more dwelling unit buildings. No communities (elderly homes) are covered in the index. The Floor area index gives the development of useful floor area in square metres. The floor area index covers the non -residential buildings (floor area of shops, hotels, schools, and hospitals etc). In many European Union countries they are prepared. The data is compiled using monthly and quarterly reference periods. Taking the base year figure as 100, the index is prepared. The base year is 2010 for some of the EU countries. The quarterly rates of change and annual rates of change is seen.

If the building permits are withdrawn subsequently, no changes are effected in the index. If the building permits are received but work not started, even then the index includes the permit. As it is not mandatory to start the construction work immediately, some builders may not start the work and some may start the work but after of lapse of time. Thus this indicator runs a risk of overestimation of the future construction activity.

### **Housing Starts**

Housing starts gives the number of newly started residential projects during the month. The US commerce department publishes the building permits, housing starts, and housing completions data every month. As housing starts get effected by the weather and economic cycles, the housing starts are seasonally adjusted and smoothened. It is one of the key economic indicators in US<sup>17</sup>. It has key linkages with other sectors like manufacturing, construction, real estate, banking, and mortgage sectors. It gives an idea of future demand for construction materials and employment of skilled and other construction workers. In this way, it drives the economy. It creates an enthusiasm in home buyers<sup>16</sup>. Generally, buyers chose to purchase the newly constructed homes or pay to have a home designed and built for them or they may purchase from the stock of old homes existing.

### **Construction price indices**

Construction price indices provide measures of changes in the prices for either the inputs to the construction or outputs of construction activity. There are three types of indices compiled in OECD and EU countries. They are Input price index, output price index and seller's price index.

### Input price index

Input price index measures the changes in the price of inputs to the construction process. The item basket includes all elements paid by the contractor (materials, labour, plant and equipment, transport, energy and other inputs)<sup>17</sup>

For input price index, representative objects like dwelling or civil engineering work of specific type, size, style etc are selected in the base year and the labour input in terms of labour hours and materials input in terms of quantity of each input (materials, plant and machinery, transport, energy and other materials) required for producing the specified categories are calculated. In further periods, the base quantities of the specified categories are multiplied by the current year corresponding price quotations and totalled. The result is compared with the base year model prices. Thus the index number is compiled. The important aspect to remember is the elements paid by contractor.

### The output price index

The output price index measures the changes in the price of produced items in the construction activity. The item basket includes all elements paid by the client (all items of input index and contractors profit margins and overheads). Its compilation is similar to industrial production index but covers only the products of construction section F in ISIC of rev 4, whereas the Index of industrial production covers the B, C, D and E sections<sup>17</sup>.

For output price index, representative objects like dwelling or civil engineering work of specific type, size, style etc are selected in the base year (as done in compilation of input price index). But here, the item basket is enlarged by more elements (like equipment hire charges, land preparation costs, kitchen fittings, overheads, profits, and trade margins are also included). For all of these items, base quantities and prices are obtained. In further periods, the base quantities of the specified items are multiplied by the current year corresponding price quotations and totalled. The result is compared with the base year model prices. Thus the output index number is compiled. The important aspect to remember here is the enlarged item basket<sup>17</sup>.

### The seller's price index

The Sellers' price index measures the changes in the price of constructed output paid by the purchaser or the final owner for the produced items in the construction activity. The item basket includes all elements paid by the final owner.(all items of output index and land costs, architects fees, client fees, vat etc). Compilation of this index is similar to the output index. There are three countries namely Canada, Spain and United states prepare the seller's price index. In EU countries, for most of the countries the base year 2010 is used.

These construction price indices are useful economic indicators for monitoring and analysing economic development. Annual rates of change for buildings and civil engineering works are studied. In some countries, the monthly data is seasonally and working- day adjusted. More specifically, these price indices are mainly used for analysis of price movements in the construction materials of the industry. It is also used for deflating the national accounts to arrive at the constant prices. They help in measuring the impacts of changing prices over the total construction cost and selling prices of construction work. They are also useful for those who want to produce construction materials and for those who want to undertake the construction contracts<sup>17</sup>.

### Source of information

The information for construction of the price indices are derived from many sources like construction firms, sub-contractors, material supply firms, trade associations, chambers of commerce, trade unions, wage regulators, enterprise surveys of entrepreneurs, transport associations, structural branches and architectural associations etc.

Details of the building construction index compiled by the Turkey<sup>17</sup> one of the OIC member countries is given he in the box3.

| Box3. Details of Building construction | Index compiled in Turkey                                                                          |
|----------------------------------------|---------------------------------------------------------------------------------------------------|
| Name of the index, frequency           | Building construction index, Quarterly                                                            |
| Institution compiling the index        | State institute of Statistics                                                                     |
| Publication                            | Quarterly Building construction cost index                                                        |
| Type of construction covered           | Dwellings, apartments, shops, commercial ,medical, schools, cultural and administrative buildings |

|                                                           |                                                        |
|-----------------------------------------------------------|--------------------------------------------------------|
| Geography covered                                         | All of the Turkey                                      |
| Items included                                            | Materials, labour and machinery                        |
| Formula used                                              | Laspeyres formula                                      |
| Base year                                                 | 1991-100, revised                                      |
| Source: Sources and methods<br>construction price indices | Joint work by OECD, Paris and<br>EUROSTAT, Luxembourg. |

## UNIT 5

### Occupational hazards and work related injuries in construction sector

#### 5.1 Occupational hazards and work related injuries

##### *Learning Objectives*

- 1) To understand various occupational hazards prevailing in the construction sector, definitions of fatal and non -fatal injuries
- 2) To know about the work related injuries and illnesses types and causes
- 3) Causes of injuries and Various Types of injuries

The construction sector has traditionally been known for its occupational hazards to the workers employed therein. These occupational hazards produce harmful effects to the health of the workers and injuries to their body parts. The occupational hazards in the construction sector are more diverse and more extreme than those of occupational hazards present in any other economic activity sectors. This makes the construction worker safety an important issue<sup>9</sup> for planning and monitoring the health and safety policies. The occupational accidental information in construction sector revealed that the likelihood of construction worker suffering a fatal injury at work is several times higher than that of the average worker (nearly 2.8 to 3.8 times higher as estimated in developed countries like France, USA, Japan, Spain, South Korea)<sup>9</sup>. It is also statistically known from the labor force survey data that the construction worker in UK is slightly at higher risk to suffer from work related illnesses than the workers in other industries<sup>10</sup>. Further, in the United Kingdom, about 3% of workers in construction sector suffer from an illness which is believed to be work related<sup>10</sup> (construction sector is a major employer accounting for around 6% of the UK workforce)<sup>10</sup>. These facts emphasize the need of giving highest priority for national policies and programs in the

field of occupational safety and health. Thus the importance of reliable statistical data on the work related injuries and diseases is felt for proper policy formulations.

An injury or illness is considered as work related if the event or exposure in the work environment causes the resulting injury or illness/condition<sup>14</sup>. The difference between the Injuries and illnesses is worth noticed. The cases resulting from an instantaneous incident are considered as injuries and the cases resulting from anything other than the instantaneous ones are considered as illness<sup>14</sup>.

The main causes of incidents resulting in injuries or deaths in the construction sector are (i) fall from heights, (ii) slips /trips or falls on the same level/ floor (iii) vehicular accidents, (iv) injuries while handling lifting or carrying, (v) struck by a moving object/ falling object/moving vehicles and (vi) falls from heights, slips and trips on same level etc. Further, the cause of injury resulted due to slips, trips or falls are further ascertained in relation to the location of the accident like (a) underground, (b) surface, (c) near to a processing plant and (d) others. Similarly, the cause of injury: struck by moving object/falling object/moving vehicle, is also classified in relation to the location of the accident<sup>14</sup>.

The type of injury could be (i) Burn, (ii) Contusion, (iii) fracture, (iv) Laceration, (v) Amputation, (vi) Multiple injuries. The body part injured could be (i) Arm, (ii) Leg, left or right or both, (iii) Head, (iv) Neck (v) Trunk and (vi) Other parts. The severity of injuries are categorized as (i) Fatal, (ii) Major and (iii) Minor.

In construction industry, there are some special trades (builders, roofers, steel erectors, plumbers, carpenters and joiners and glaziers) where in workers engaged in these trades are exposed to higher risk of occupational injuries/diseases/ illnesses. The workers in these trades get injured due to falling from rooftops, unguarded machinery, being struck by heavy construction equipment, or exposed to electrocutions, or become sick due to the silica dust, and to asbestos dust. This was a statistically proved fact in many countries.

## **5.2 OSH programs and ILO's guidelines on collection of data**

### *Learning Objectives*

- 1) To understand the OSH frame work, ILO guidelines regarding reliable data collection

- 2) To understand the availability of data and under coverage of work related accidents

The ILO estimates that about 2.3 million workers die each year from work related accidents and diseases<sup>12</sup>. It also estimates that the workers suffer 270 million accidents every year and there are at least 335000 fatal injuries caused by accidents at work<sup>15</sup> and about 400,000 deaths occur due to exposure of chemicals annually<sup>13</sup>. It is reasonably stated that about 55000 fatalities occur at construction sites around the world every year<sup>9</sup>. The ILO underlined the importance of Occupational Safety and Health (OSH) programs and developed suitable guidelines. These guidelines provide on the systems to be developed both at enterprise level, and at industry and at national level for developing preventive safety and health culture<sup>12</sup>.

The ILO recognized the need of health and safety in construction industry as early as in 1937, and adopted the convention 62 on the need of safety provisions for the building industry<sup>10</sup>. This was reviewed and a new standard was adopted (convention no 167) in the year 1988. In this convention, emphasis was given for planning and coordination of safety and health at the construction sites. Once again, the ILO adopted in 1992, a new code of practice on safety and health in construction. Further in 2006, the new promotional framework for OSH Convention (No 187), OSH Recommendations (No 197) were also adopted by the International Labor Conference in June 2006.

Collection of comprehensive data on the work related accidents and diseases through administrative records and through insurance scheme records was given importance in the ILO guidelines. From this type of data, annual trend in number of fatalities, rate of injury and rate of illness cases per 100 full term workers for (i) the total recordable cases, (ii) cases involving the days away from work, (iii) cases involving the job transfer or restrictions are compiled. In some countries, the fatal incidence rate per 1000 population at risk, and injury incidence rate per 1000 population at risk are compiled. The national OSH profiles are also created for international comparability and future direction .

The occupational accidental data so collected should be analyzed in order to (i) formulate effective national programs, (ii) setting priorities for their implementation, (iii) to have proper risk assessments of chemical and other explosions, (iv) to have risk

analytical reports to determine the degree of risk reduction and effectiveness of the emergency measures available and (v) to understand the coverage of accidents and underreporting of the incidents if any.

Construction project managements should use these results to establish a proper environment for planning and coordination practices to meet the urgent events. They should provide comprehensive safety standards, and appropriate measures like (i) sensitization of work environment, (ii) creation of safety environment and work culture to all concerned (workers/contractors/customers). Refresher, remedial and skill improvement training courses to the employees are also to be conducted<sup>15</sup>.

Comprehensive and reliable data on the occupational injuries and diseases for all the OIC member countries is not available at one place due to limited scope of the national reporting systems. Table 5 below depicts the details on occupational injuries (both fatal and non-fatal) in construction industry of four OIC member countries for which data is available. The data relate to different years for different countries and as such strict comparison of the injuries among the four countries could not be done. However, the information given in the table on the rate per 100000 workers at risk, could be seen to infer the magnitude of the injuries for a specific country for the given year.

**Table 5 :Occupational injuries reported in construction sector of some of the OIC countries and rates per 100000 employees insured**

| Country | Total employment and injuries for all economic activities * |       |            |                                    |            | Paid employment and injuries for Construction** |       |           |                                    |           |
|---------|-------------------------------------------------------------|-------|------------|------------------------------------|------------|-------------------------------------------------|-------|-----------|------------------------------------|-----------|
|         | Injuries                                                    |       |            | Rates per 100000 employees insured |            | Injuries                                        |       |           | Rates per 100000 employees insured |           |
|         | Paid employment in 000s@                                    | Fatal | Non Fatal^ | Fatal                              | Non Fatal^ | Paid employment in 000s@                        | Fatal | Non Fatal | Fatal                              | Non Fatal |

|            |         |         |       |    |      |        |     |      |    |      |
|------------|---------|---------|-------|----|------|--------|-----|------|----|------|
|            |         |         |       |    |      |        |     |      |    |      |
| Turkey     | 12937   | 86<br>6 | 1694  | 10 | 19   | 1002   | 297 | 377  | 24 | 30   |
| Azerbaijan | 1719.3  | 72      | 212   | 7  | 21   | 181.8  | 30  | 50   | 48 | 80   |
| Bahrain    | 431.19  | 23      | 952   | 5  | 221  | 128.75 | 10  | 127  | 8  | 99   |
| Egypt      | 12715.1 | 11<br>0 | 26884 | 7  | 1580 | 1470.5 | 8   | 2269 | 9  | 2672 |
|            |         |         |       |    |      |        |     |      |    |      |

**Notes:**

for the country Azerbaijan, the employment is of 2008 LFS, injuries and rates are also for 2008

for the Bahrain, the employment is of 2008 LFS, injuries and rates are also for 2008

For the country Egypt, the employment is of 2007 LFS, injuries and rates are for the year 2003

For the country Turkey, the employment is of 2008 LFS with rev 3 classification, injuries and rates are also for the year 2008 with Rev 4 classification

**Source:**

**International Labour Organisation data base on occupational injuries**

<http://laborsta.ilo.org>

As per the Insurance records@

\*\*ISIC Rev 3 classification is followed for all countries but for Turkey it is ISIC rev 4..

^Non fatal includes both temporarily and permanently incapacitated.

\* For all economic activities

## UNIT 6

### Issues in Data collection and data processing and Data dissemination

#### 6.1 Issues in data collection and data processing

##### *Learning Objectives*

1. Understand various issues existing in various source agencies, data collection practices
2. To understand the under coverage in construction work related to accidents
3. To know about the specific issues in compilation of construction statistics

Information on construction items is generally collected from business registers, list frames, or through the Economic censuses, through sample surveys of establishments, or through the Labour force surveys etc. In some countries, the statistics on unemployment, membership of unions, and representation by unions are collected from current population survey. For majority of items on the employment and wages, the information is from the current employment statistics, Occupational statistics or labour force surveys.

The list frames and business registers suffer from incompleteness and infrequent mechanism of updating. They may contain only large scale and medium scale units. Informal units might be omitted. New business units might also have been missed. Businesses that are no longer existing might have not been deleted.

The census data generally suffers from a variety of non-sampling errors and also involves in huge costs. In current scenario, many countries are not planning for census of construction establishments due to its prohibitive costs and defective list frames. In many Middle East and African countries even the population and housing/building census is not being done on census basis.

The data from the sample surveys often suffer from its limited scope and coverage issue, non-response, and other variety of factors relating to sampling designs etc. The unincorporated household construction units undertaking construction activity for own use ( building and expanding the living area using indigenous skills, locally procured traditional materials, own labour or manual labour on exchange type) might have been missed from sample coverage/selection as they might have already been missed for listing in the frames. Non response errors are caused largely due to incorrect procedures followed for dealing with the non-response. Proper imputation methods might have not been utilized to cope with the missing values. Even the responded units in the sample survey might have deliberately over reported or under reported or concealed the information on some items in the questionnaire.

In the light of the situation specified above, a judicious mix of collection systems/ mechanisms and a healthy practice of data collection techniques following the principles laid down in the international guidelines is required to be established in each country. The questionnaires should be simple and short but at the same time should meet the requirement for generation of core statistics/ indicators that are to be brought out on construction industry as a whole.

Information on occupation injuries is collected generally from government administrative records or records maintained by insurance agencies and the establishment records. In some countries, they are collected from the regulatory agencies health and safety in construction sector. These administrative records are maintained to meet the special needs of administrative agencies. The data compiled from these agencies may not meet the rigorous statistical standards like concepts & definitions, classifications of products, activities etc. as laid down by the international agencies to have proper international comparability. Further, the information on accidents which resulted in more than 3 or 4 days of absence from work are generally reported / compiled and analyzed in many countries by the concerned agencies. This induces underestimation of the size of the problem by not including the less serious injuries. Additional information on the age of injured persons, their work experience, time of the day when the accident occurred, day of the week, job title, are also to be collected for a comprehensive study of the accidents and injuries caused therein.

#### Specific issues in measurement of construction output

It is difficult to qualify the construction output accurately mainly because of the definition of construction concept. If one approaches the construction as the industry, the construction output could be reasonably measured through the census or surveys of the establishments/ contractors / firms engaged in the construction. But if construction is viewed as an activity, then one faces many obstacles while measuring the construction output mainly because of construction activity taken up by individual households.

The rural households do undertake many construction activities for their own use like construction of thatched house for dwelling, kuccha shelters created / built for sheltering the livestock, using traditional locally procured materials in rural areas and utilising their own household manual labour. They undertake many other activities while undertaking farm activities which fall into the construction sector. The activities like making bund around the agricultural land, digging wells, preparation of ponds, cultivation of plantation crops etc. are some of them. They are mostly unreported or under reported. Involvement of do it yourself material and do it yourself manual labour is very high in the construction activity. The existence of informal economy also contributes to the under reporting in construction output.

The construction activity is dispersed throughout the country, (ii) it is a highly heterogeneous sector including high rise residential towers to construction of thatched houses (product differentiation), involving new and advanced technologies in

construction of cause ways, underground tunnels, high speed motor ways etc. to a traditional ways of semi – skilled and un skilled manual labour in construction of structures, shelters for animals etc,(technology issues). Moreover, most of the construction work currently is automated. There are many construction projects take more than one year time period for completion. In fact the production cycle in construction is often quite lengthy, varying from a few months for construction a small house to many years in the case of civil engineering projects. Further, involvement of many firms/ establishments (large size firms and small size specialised trades, licenced ones and un-licensed ones and highly skilled labour to manual labour are involved in the construction activity. These issues add to the problem of measurement and estimation.

There are different units of measurement followed in construction activity (of a small streets, buildings, bridges, elevated highways and causeways etc.). In volume terms, it would be number of houses constructed, number of buildings with given specified flour area, number of dams, bridges with specified area and pillars (with unit value of structures), and number of parks, schools, hospitals with specified facilities etc, The most useful unit of measurement is the financial terms. This varied phenomenon demands estimates prepared at unit/ item level and aggregated to local /region/ state/ national level using appropriate rates and ratios.

While expanding or weighting the estimates, the price indicators play a crucial role. Selection of price indices is to be done judiciously. Correction factors to values and conversion factors from volumes to values etc. are to be worked out based on special surveys and used carefully.

Construction estimates by region namely like Rural and urban areas, accounted and unaccounted construction, local, state wise, federal government, country level, province are to be prepared. If the economy has got superregional construction activity (like construction under taken for railways, communications, public sector banking and insurance work, oil and gas pipelines over different provinces or states or governorates, then the construction work done for the entire supra region is to be worked out first and thereafter redistributed to provinces or state or governorates.

Besides, there are many other issues like coverage issues. Lack of uniform guidelines, standard definitions and guidelines on coverage of construction items for preparation of price indices, historical and local conventions used in classification of establishments, lack of uniform computational methodologies for price indices (formulae), issues related to weighting diagrams, frequency of base year revisions, are effecting the quality aspects at all stages of data collection and data processing. These issues need to be properly addressed.

Further data also need to be disseminated according to the principles laid down in the IMF GDDS and SDDS standards. The dissemination of data at some minimum level of classification (say 2 or 3 digit level of ISIC or for 2 or 3 digit level of (CC) construction classification by types) is also to be followed.

## **6.2 Data Dissemination practices at national and international level**

### *Learning Objectives*

- 1.To know about the national level publications that provide data on construction*
- 2.To understand about the international level publications / data bases related to construction .*

Construction sector statistics are disseminated periodically to all important international agencies, other government agencies, and to the public in the form of newsletters, construction reports. Different publications are released in different countries. Moreover, the titles are different but content is same in some publications. Some of the publications released by various countries giving constructions statistics are listed below:

- I. Annual survey of construction units
- II. Annual business statistics
- III. Annual survey of Industries
- IV. Building census
- V. Building permits statistics
- VI. Business registers
- VII. Current construction statistical reports
- VIII. Directories of construction units
- IX. Health and safety Statistics/ reports in Construction sector
- X. Population and housing census
- XI. Producer's price index/ whole sale price index/retail price index
- XII. Quarterly building construction cost index
- XIII. Reports on Labor force surveys
- XIV. Reports on Economic Censuses/ General census of business and industry establishments
- XV. Reports on Enterprise surveys
- XVI. Statistical indicators

## XVII. Statistical year book

Some international publications and data bases which give comprehensive data on construction sector are listed below.

- I. African Newsletter on Occupational Health and Safety
- II. Building construction hand book UK
- III. GCC powers of construction ,Deloittee Middle east
- IV. GCC construction 2015, by MEED, Middle east business Intelligence
- V. GCC construction Industry report, Alpen capital (ME)limited
- VI. Health and safety in construction sector in Great Britain, 2014/15
- VII. International Labour Organization, Key indicators of Labour Market, 8 th edition
- VIII. International Labour Organization, Labour statistics data base (ILOSTAT)
- IX. International Year book of industrial Statistics, UNIDO
- X. Monthly bulletin of statistics Series Q no 509, UNSD Publication
- XI. Statistical Economic and Social Research & Training Centre for Islamic Countries (SESRIC) BASEIND data base
- XII. US Bureau of Labor Statistics, Industries at a glance, construction
- XIII. World Bank, World development Indicators (WDI) on line data base

## GLOSSARY

| Item      | Units  | Definition                                                                                                                      |
|-----------|--------|---------------------------------------------------------------------------------------------------------------------------------|
| Buildings | Number | Permanently constructed roofed structures capable of being used independently for occupation of humans or to provide shelter to |

|                           |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                          | animals, goods, equipment or for industrial activities.                                                                                                                                                                                                                                                                                                                                                                            |
| Building Permits          | Number                   | It is the final administrative authorization to start work on a concrete building project and one of the last step before the actual construction work starts. It is granted by a public authority like Municipality in response to an application based on a specific building plan. The term refers to permits for building only (both residential and nonresidential buildings)                                                 |
| Construction permits      | Number                   | It is the final administrative authorization to start work on a construction project and one of the last step before the actual construction work starts. It is granted by a public authority like Municipality in response to an application based on a specific plan. The term refers to permits for buildings (both residential and nonresidential buildings) and civil engineering works. This term is used in some countries. |
| C.I.F Prices              | National currency or USD | The c.i.f price is the price of a good delivered at the custom boarder of importing country and includes cost, insurance and freight                                                                                                                                                                                                                                                                                               |
| Client                    |                          | Natural or legal person for whom a structure is constructed or alternatively the person or organization that took the initiative of the construction.                                                                                                                                                                                                                                                                              |
| Construction              |                          | Deemed to mean an item/structure connected to ground, made from construction materials and components and or for which construction work is carried out.                                                                                                                                                                                                                                                                           |
| Construction Industry     |                          | Refers to all construction activities within the division of 41, 42, 43 of ISIC rev 4. They comprise construction of buildings, civil engineering works and other specialized construction activities. It includes new works and repair and maintenance. Hire of construction plant and equipment with the operation is also included.                                                                                             |
| Construction share in GDP | percentage               | Expressed as share of GDP. Industry includes Mining, manufacturing and Utilities (electricity and water). It represents all the economic activities listed in section B,C, D and E of ISIC rev 4.                                                                                                                                                                                                                                  |
| Contractor                |                          | A firm which undertakes works as part of a construction project by virtue of a contract with a client.                                                                                                                                                                                                                                                                                                                             |
| Dwellings                 |                          | Deemed to be one or more rooms plus annexes within a building whose design and manner of construction make it suitable for use as a private residence. Should have its own access to the road or to the staircase or to                                                                                                                                                                                                            |

|                                                              |                          |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                              |                          | corridor, gallery etc. within a building                                                                                                                                                                                                                                                                                                                                                                                    |
| Employees                                                    | Number                   | Employees are people who work for a public or private employer and receive remuneration in wages, salary, commission, tips, or pay in kind or piece rates.                                                                                                                                                                                                                                                                  |
| Employment in Construction as percentage of total employment | percentage               | Employees in industry corresponds to ISIC sections Mining, Manufacturing, Electricity, Water, and Construction. Includes                                                                                                                                                                                                                                                                                                    |
| Export price index                                           | number                   | The export price index measures the percentage change in prices received by the country's producers for goods and services sold outside the country. This index is calculated for the prices of one or any specified group of commodities entering into the international trade using f.o.b export prices.                                                                                                                  |
| Fatal occupational injury                                    | Number                   | An occupational injury that is fatal is the result of an occupational accident where death occurred within one year from the date of the accident                                                                                                                                                                                                                                                                           |
| Final owner                                                  |                          | A person or an organization that pays the final seller's price. May be same as the client in some cases. He is also known as purchaser.                                                                                                                                                                                                                                                                                     |
| F.O.B. Prices                                                | National currency or USD | The f.o.b prices are free on board prices. It is the market value of goods at the point of custom's frontier of the economy.                                                                                                                                                                                                                                                                                                |
| GDP at current prices                                        | National currency or USD | Gross domestic product at current prices is GDP for current reporting period at current prices, also known as the nominal GDP. It is an aggregate measure of production equal to the sum of the gross value added of all resident institutional units engaged in production.                                                                                                                                                |
| GDP per capita                                               | National currency or USD | Gross Domestic product per capita is calculated as the aggregate of production divided by the population                                                                                                                                                                                                                                                                                                                    |
| GCF                                                          | National currency or USD | It includes the GFCF, changes in inventories and acquisition less disposals of valuables such as jewelry and works of art. change in valuables                                                                                                                                                                                                                                                                              |
| GFCF                                                         | National currency or USD | It includes (i) the acquisition less disposal of new or existing produced assets such as dwellings, other structures, (ii) major improvements to produced and non produced non financial assets like reclamation of land from sea, clearance of forests, rock etc., draining of marshes, or irrigation of forests, prevention of flooding and erosions (iii) costs of ownership transfers such as land and patented assets. |
| Housing starts                                               | Number                   | The number of new residential construction projects that have begun during any particular month or quarter.                                                                                                                                                                                                                                                                                                                 |

|                                                      |        |                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Import price index                                   | number | The import price index reflects the percentage change in the prices paid to the foreign producers/ suppliers for the goods and services purchased and brought into the country. This index is calculated for the prices of one or any specified group of products at CIF import prices.                   |
| Index of industrial production                       | number | It is intended to measure changes in volume of production of basket of industrial products to that of base year period, between two periods of time. The index is compiled as a weighted average of production relatives of a specified set of goods or services, generally using the Laspeyre's formula. |
| Input price index                                    | number | Measures the changes in the price of inputs to the construction process by monitoring separately the cost of each factor both materials and labour.                                                                                                                                                       |
| Non-fatal occupational injury with loss of work days | Number | A non- fatal occupational injury is an occupational injury resulted due to an occupational accident that does not lead to death. It entails a loss of working time.                                                                                                                                       |
| Non-residential buildings                            |        | Any building of which more than 50 percent of the useful floor area is used for non-residential purposes.                                                                                                                                                                                                 |
| Occupational injury                                  |        | The occupational injury is the case of a worker incurring an occupational injury as a result of an occupational accident.                                                                                                                                                                                 |
| Output price index                                   | Number | Measure the changes in the prices of what is produced by the establishments in construction activity.                                                                                                                                                                                                     |
| Producers price index                                | number | The producer price index measures the percentage change in prices received by the producers for goods and services. This index is constructed from the price data supplied by producers.                                                                                                                  |
| Residential buildings                                | number | Any building of which more than 50 percent of the useful floor area is used for residential purposes                                                                                                                                                                                                      |
| Seller's price index                                 |        | Measures the changes in the prices of construction output paid by the purchaser or final owner of the output of construction activity.                                                                                                                                                                    |

**Annex-1: Detailed structure at single digit level of International Standard Industrial Classification of All Economic Activities, Rev.4, (ISIC Rev4), released on 11 th August 2008**

- A - Agriculture, forestry and fishing
  - B - Mining and quarrying
  - C - Manufacturing
  - D - Electricity, gas, steam and air conditioning supply
  - E - Water supply; sewerage, waste management and remediation activities
  - F - Construction
  - G - Wholesale and retail trade; repair of motor vehicles and motorcycles
  - H - Transportation and storage
  - I - Accommodation and food service activities
  - J - Information and communication
  - K - Financial and insurance activities
  - L - Real estate activities
  - M - Professional, scientific and technical activities
  - N - Administrative and support service activities
  - O - Public administration and defence; compulsory social security
  - P - Education
  - Q - Human health and social work activities
  - R - Arts, entertainment and recreation
  - S - Other service activities
  - T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
  - U - Activities of extraterritorial organizations and bodies
  -
- 

**Annex -2 :Detailed structure of Central Product Classification, Ver.2, (CPC Ver.2) Completed on 31<sup>st</sup> December 2008**

- 0 - Agriculture, forestry and fishery products
- 1 - Ores and minerals; electricity, gas and water
- 2 - Food products, beverages and tobacco; textiles, apparel and leather products
- 3 - Other transportable goods, except metal products, machinery and equipment
- 4 - Metal products, machinery and equipment
- 5 - Constructions and construction services

- 6 - Distributive trade services; accommodation, food and beverage serving services; transport services; and electricity, gas and water distribution services
- 7 - Financial and related services; real estate services; and rental and leasing services
- 8 - Business and production services
- 9 - Community, social and personal services

| <b>Annex-3</b> | <b>Classification of types of constructions developed by EUROSTAT up to three digit level</b> |               |                                    |            |                                                                                  |
|----------------|-----------------------------------------------------------------------------------------------|---------------|------------------------------------|------------|----------------------------------------------------------------------------------|
| Section code   | Section description                                                                           | Division code | Division description               | Group code | Group description                                                                |
| <b>1</b>       | <b>Buildings</b>                                                                              | <b>11</b>     | <b>Residential buildings</b>       | <b>111</b> | One dwelling buildings                                                           |
|                |                                                                                               |               |                                    | <b>112</b> | Two and more dwelling buildings                                                  |
|                |                                                                                               |               |                                    | <b>113</b> | Residences for communities                                                       |
|                |                                                                                               | <b>12</b>     | <b>Non - residential buildings</b> | <b>121</b> | Hotels and similar buildings                                                     |
|                |                                                                                               |               |                                    | <b>122</b> | Office buildings                                                                 |
|                |                                                                                               |               |                                    | <b>123</b> | Wholesale and retail trade buildings                                             |
|                |                                                                                               |               |                                    | <b>124</b> | Traffic and communication buildings                                              |
|                |                                                                                               |               |                                    | <b>125</b> | industrial buildings and ware houses                                             |
|                |                                                                                               |               |                                    | <b>126</b> | Buildings for public entertainment, education or hospital and institutional care |
|                |                                                                                               |               |                                    | <b>127</b> | Other non-residential buildings                                                  |
| <b>2</b>       | <b>Civil engineering works</b>                                                                | <b>21</b>     | <b>transport infrastructure</b>    | <b>211</b> | Highways, streets and roads                                                      |
|                |                                                                                               |               |                                    | <b>212</b> | railways                                                                         |
|                |                                                                                               |               |                                    | <b>213</b> | airfield runways                                                                 |
|                |                                                                                               |               |                                    | <b>214</b> | Bridges, elevated highways, tunnels and subways                                  |
|                |                                                                                               |               |                                    | <b>215</b> | harbors, waterways, dams and other water works                                   |

|  |  |           |                                                |            |                                                                                                  |
|--|--|-----------|------------------------------------------------|------------|--------------------------------------------------------------------------------------------------|
|  |  | <b>22</b> | Pipelines, communication and electricity lines | <b>221</b> | Long distance pipelines, communication and electricity lines                                     |
|  |  |           |                                                | <b>222</b> | Local pipelines and cables                                                                       |
|  |  | <b>23</b> | Complex constructions on industrial sites      | <b>230</b> | Complex constructions on industrial sites eg power plants, chemical plants, mining constructions |
|  |  | <b>24</b> | Other civil engineering works                  | <b>241</b> | Sport and recreation constructions                                                               |
|  |  |           |                                                | <b>242</b> | Other civil engineering works                                                                    |
|  |  |           |                                                |            |                                                                                                  |

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