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#### CONSTRUCTION PRICE INDEX

## (Input Cost Index for the construction of a single storey house)

## 1<sup>st</sup> Quarter 2002

### 1. Introduction

The Construction Price Index was first compiled by the Central Statistics Office in 1994. The index which was published regularly on a quarterly basis had as base period the 4<sup>th</sup> quarter of 1993 and the model house used for computing the index was the most common type enumerated at the 1990 Housing Census.

A review of the specifications and weights was necessary to take into account changes with respect to both inputs and technology that have occurred in the construction industry since 1993.

The methodology used for this review is described at Section 2 while the index for the first quarter of 2002, with 4<sup>th</sup> quarter 2001 as new base period, is given at Section 3.

### 2. Methodology

### 2.1 Types of Construction Price Indices

A Construction Price Index measures the change in the level of construction prices. The construction industry is very broad and highly diversified with considerable variations from one type of construction to another. This makes it difficult to derive generalized indices that would be applicable to the industry as a whole. As a result, different approaches to index number compilation are used depending on the purpose for which the index is required.

The two main types of construction price indices are:

i. The Output Price Index

In this approach, specific projects representative of the various categories of construction works are selected as models and construction firms are surveyed and asked to provide estimates of the prevailing market prices for each of the projects. As such, the output price indices respond to the changes in prices of materials used and cost of labour, as well as changes in overhead costs and profits.

ii .The Input Price Index

The index is based on prices of a representative selection of basic inputs (labour, plant, materials and transport) that go into the construction work. Hence, the input price index measures the change in the cost of resources to the contractor, and not the change in the price that the client pays.

The office opted for the input price index, which though more limiting than the output price index, is simpler and less expensive to construct and maintain.

#### 2.2 Selection of representative residential building

Since it would have been too time-consuming and costly to include all major types of residential dwellings, it was decided to restrict the index to the most common type identified at the 2000 Housing Census. The drawings of the prototype model dwelling were provided by the Mauritius Housing Company Ltd. A description of the model is given in the Annex.

#### <u>2.3 Weightings</u>

The quantity survey work to determine the weighting pattern for the index was entrusted to a private firm of Quantity Surveyors following established procedures.

Any given construction consists of an assembly of a certain number of stages or work categories. Nineteen stages or broad work categories were identified and detailed costs of inputs in terms of labour, plant, materials and transport

that go into the construction of the selected model were calculated under each of the 19 work categories. The weights have been worked out in such a way that they can be presented in terms of inputs as well as work categories. For publication purposes, weights and sub-indices are shown not only for the 19 work categories, but also for the 4 broad input categories of labour, plant, materials and transport, the "materials" category being further sub-divided into 17 sub-categories.

Tables 1 and 2 show the weighting pattern of the work and input categories respectively according to the previous (4<sup>th</sup> quarter 1993) and new (4<sup>th</sup> quarter 2001) bases.

## 2.4 Data collection

The data needed for the computation of the index are collected every month by staff of the Central Statistics Office from a sample of 53 outlets in 8 regions of the island. Prices are collected in respect of some 84 items, representative of all items that go into the computation of the index.

#### 2.5 Index calculation

The Construction Price Index is a weighted average of price relatives of individual items, based on the modified Laspeyres formula:



- It = index for current period t
- P<sub>io</sub> = price of item i at base period
- P<sub>it</sub> = price of item i at current period
- $W_i =$  weight of item i

The base period is the 4<sup>th</sup> quarter of 2001.

## <u>2.6 Uses</u>

- a. Construction price indices give an indication of the change in the level of prices of construction works. As such, they are used as deflators for the measurement of real growth in the construction sector.
- b. They are also useful for evaluating cost fluctuations in contracts regarding construction works and for renegotiating owner-tenant agreements.

## 3. Construction Price Index: 1<sup>st</sup> Quarter 2002

It is to be noted that figures have been rounded to one decimal place although they have been calculated to many decimal places.

## 3.1 Changes in the index

The Construction Price Index with 4<sup>th</sup> Quarter 2001=100 as base, stood at 100.3 for the month of January 2002 as a result of higher prices of cement and block.

It increased by 0.2 point in February (100.5) following increases in the prices of steel bars.

Higher costs of pine planks and ceramic tiles pushed up the index by 0.1 point in March (100.6).

## 3.2 Changes by input categories

Changes by input categories are shown in Tables 3.1 to 3.4. No change was registered in the "Labour", "Hire of Plant" and "Transport" categories during the 1<sup>st</sup> guarter of 2002.

The sub-index for the "Materials" category moved up to 100.5 in January 2002 due to increases of 1.8% in the costs of cement and block. The sub-index attained a level of 100.9 in February following an increase of about 4% in the prices of steel bars. It further increased to 101.0 in March mainly as a result of higher costs of pine planks (1%) and ceramic tiles (1-2%).

The net monthly contributions of the input categories to the index during the 1<sup>st</sup> quarter of 2002 are shown in Table 3.3.

Quarterly averages of the monthly indices by input categories and the percentage change from the base period are shown in Table 3.4.

### 3.3 Changes by work categories

Changes by work categories are shown in Tables 4.1 to 4.4

In January, higher prices of cement caused an increase in various work categories, the main ones being "Concrete" (0.5%), "Rendering to wall and ceiling" (0.3%), and "Bed and screed to floor and roof" (0.7%). In the same month, "Blockwork" moved up by 1.0% following higher prices of block.

In February, increases in the prices of steel bars caused the sub-index for "Reinforcement" to rise by 2.5%.

Higher costs of pine planks and ceramic tiles in March pushed up the sub-indices for "Formwork" and "Tiling" by 0.4% and 0.7% respectively.

Table 4.3 shows the net monthly contributions of the work categories to the index during the 1<sup>st</sup> quarter of 2002.

Quarterly averages of the monthly indices by work categories and the percentage change from the base period are shown in Table 4.4.

## 4. Comparison with previous series

Table 5 summarizes the monthly indices, the quarterly and yearly averages as well as the changes in the yearly average since 1998. Indices for the years 1998 to 2001 have been worked out using as base the 4<sup>th</sup> quarter 1993, while the base period for the calculation of the index for the first quarter of 2002 was 4<sup>th</sup> quarter 2001.

The two series are not strictly comparable since they are based on different weighting patterns. However, for some particular purposes, a comparison between the old and the new index may be necessary. A crude method of converting an index on the new base to one on the old base is by multiplying the new index by the coefficient 1.282.

For example, the index for January 2002, which stands at 100.3 on the new base, works out to 100.3 X 1.282 = 128.6, when referred to the old base.

Central Statistics Office Ministry of Economic Development, Financial Services and Corporate Affairs Port Louis June 2002

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# Table 1: Weights by Input Categories, previous and new base periods

	Weig	ht
Input Categories	Previous base period: 4th Qr 1993	New base period: 4th Qr 2001
LABOUR	32.8	34.5
HIRE OF PLANT	4.0	3.0
MATERIALS :	58.7	57.2
Hardcore (remplissage)	1.0	1.0
Cement	12.0	10.0
Sand	5.3	6.1
Aggregate	2.4	2.9
Block	3.9	4.4
Steel bars (armature)	5.1	5.8
Galvanised corrugated cast iron sheeting	1.5	1.2
Timber: (a) Carpentry	6.1	3.9
(b) Joinery	2.4	4.2
Metal openings	4.9	6.1
Ceramic tiles	1.4	1.3
Glass and putty	0.8	0.7
Paint	1.9	2.0
Plumbing	2.1	1.5
Sanitary installation	2.0	2.3
Electrical installation	3.2	2.6
Other	2.7	1.2
TRANSPORT	4.5	5.3
Total	100.0	100.0

## Table 2: Weights by Work Categories, previous and new base periods

	Weig	yht
Work Categories	Previous base period: 4th Qr 1993	New base period: 4th Qr 2001
1. Setting up	2.9	2.3
2. Setting out	0.5	0.5
3. Temporary works	1.1	0.5
4. Site preparation, excavation & disposal, hardcore filling	5.5	5.8
5. Concrete	20.1	20.2
6. Reinforcement	8.3	9.2
7. Formwork (coffrage)	9.8	7.8
8. Blockwork	7.6	8.5
9. Softwood joinery	2.8	4.5
10. Ironmongery	0.9	0.5
11. Metal openings	5.3	6.5
12. Rendering to wall/ceiling (crépissage)	9.8	9.9
13. Bed & screed to floor/roof	4.1	4.2
14. Tiling	2.4	2.1
15. Glazing	1.0	1.0
16. Painting	4.3	5.2
17. Plumbing/sanitary installation	5.9	5.0
18. Electrical installation	5.1	4.2
19. Drainage	2.6	2.1
Total	100.0	100.

Table 3.1: Monthly	sub-indices by inpu	t categories, January	y to March 2002
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Innut Catagorias	\\/oight		2002			
Input Categories	Weight	Jan	Feb	Mar		
LABOUR	34.5	100.0	100.0	100.0		
HIRE OF PLANT	3.0	100.0	100.0	100.0		
MATERIALS :	57.2	100.5	100.9	101.0		
Hardcore (remplissage)	1.0	100.0	100.0	100.0		
Cement	10.0	101.8	101.8	101.8		
Sand	6.1	100.0	100.0	100.0		
Aggregate	2.9	100.0	100.0	100.0		
Block	4.4	101.8	101.8	101.8		
Steel bars (armature)	5.8	100.0	104.0	104.0		
Galvanised corrugated cast iron sheeting	1.2	100.0	99.5	99.5		
Timber: (a) Carpentry	3.9	100.0	100.0	100.9		
(b) Joinery	4.2	100.0	100.4	100.4		
Metal openings	6.1	100.0	100.2	100.3		
Ceramic tiles	1.3	100.0	100.0	101.1		
Glass and putty	0.7	100.0	100.0	100.1		
Paint	2.0	100.0	100.6	100.6		
Plumbing	1.5	100.0	100.0	100.1		
Sanitary installation	2.3	100.1	100.1	99.7		
Electrical installation	2.6	100.0	100.0	100.0		
Other	1.2	100.0	99.9	99.9		
TRANSPORT	5.3	100.0	100.0	100.0		
OVERALL INDEX		100.3	100.5	100.6		

# Table 3.2: Percentage change from previous month by input categories, January to March 2002

		2002			
Input Categories	Weight	Base to Jan	Jan to Feb	Feb to Mar	
LABOUR	34.5	0.0	0.0	0.0	
HIRE OF PLANT	3.0	0.0	0.0	0.0	
MATERIALS :	57.2	0.5	0.5	0.1	
Hardcore (remplissage)	1.0	0.0	0.0	0.0	
Cement	10.0	1.8	0.0	0.0	
Sand	6.1	0.0	0.0	0.0	
Aggregate	2.9	0.0	0.0	0.0	
Block	4.4	1.8	0.0	0.0	
Steel bars (armature)	5.8	0.0	4.0	0.0	
Galvanised corrugated cast iron sheeting	1.2	0.0	-0.5	0.0	
Timber: (a) Carpentry	3.9	0.0	0.0	0.9	
(b) Joinery	4.2	0.0	0.4	0.0	
Metal openings	6.1	0.0	0.2	0.0	
Ceramic tiles	1.3	0.0	0.0	1.1	
Glass and putty	0.7	0.0	0.0	0.1	
Paint	2.0	0.0	0.6	0.0	
Plumbing	1.5	0.0	0.0	0.1	
Sanitary installation	2.3	0.1	0.0	-0.4	
Electrical installation	2.6	0.0	0.0	0.0	
Other	1.2	0.0	-0.1	0.0	
TRANSPORT	5.3	0.0	0.0	0.0	
OVERALL CHANGE		0.3	0.3	0.	

# Table 3.3: Net monthly contributions of input categories to the index, January to March 2002

			2002			
Input Categories	Weight	Base to Jan	Jan to Feb	Feb to Mar		
LABOUR	34.5	0.00	0.00	0.00		
HIRE OF PLANT	3.0	0.00	0.00	0.00		
MATERIALS :	57.2	+0.27	+0.27	+0.04		
Hardcore (remplissage)	1.0	0.00	0.00	0.00		
Cement	10.0	+0.19	0.00	0.00		
Sand	6.1	0.00	0.00	0.00		
Aggregate	2.9	0.00	0.00	0.00		
Block	4.4	+0.08	0.00	0.00		
Steel bars (armature)	5.8	0.00	+0.23	0.00		
Galvanised corrugated cast iron sheeting	1.2	0.00	-0.01	0.00		
Timber: (a) Carpentry	3.9	0.00	0.00	+0.03		
(b) Joinery	4.2	0.00	+0.02	0.00		
Metal openings	6.1	0.00	+0.02	0.00		
Ceramic tiles	1.3	0.00	0.00	+0.02		
Glass and putty	0.7	0.00	0.00	0.00		
Paint	2.0	0.00	0.01	0.00		
Plumbing	1.5	0.00	0.00	0.00		
Sanitary installation	2.3	0.00	0.00	-0.01		
Electrical installation	2.6	0.00	0.00	0.00		
Other	1.2	0.00	0.00	0.00		
TRANSPORT	5.3	0.00	0.00	0.00		
TOTAL	100.0	+0.27	+0.27	+0.04		

# Table 3.4: Quarterly average of monthly indices and percentage changes by input categories, January toMarch 2002

Input Categories	Weight	1st Qr 2002	% change from Base
LABOUR	34.5	100.0	0.0
HIRE OF PLANT	3.0	100.0	0.0
MATERIALS :	57.2	100.8	0.8
Hardcore (remplissage)	1.0	100.0	0.0
Cement	10.0	101.8	1.8
Sand	6.1	100.0	0.0
Aggregate	2.9	100.0	0.0
Block	4.4	101.8	1.8
Steel bars (armature)	5.8	102.6	2.6
Galvanised corrugated cast iron sheeting	1.2	99.7	-0.3
Timber: (a) Carpentry	3.9	100.3	0.3
(b) Joinery	4.2	100.3	0.3
Metal openings	6.1	100.2	0.2
Ceramic tiles	1.3	100.4	0.4
Glass and putty	0.7	100.0	0.0
Paint	2.0	100.4	0.4
Plumbing	1.5	100.0	0.0
Sanitary installation	2.3	100.0	0.0
Electrical installation	2.6	100.0	0.0
Other	1.2	99.9	-0.1
TRANSPORT	5.3	100.0	0.0
OVERALL INDEX AND CHANGE		100.5	0.5

## Input Cost Index for the construction of a single storey house

## (Base: 4th Quarter 2001 = 100)

# Table 4.1: Monthly sub-indices by work categories, January to March 2002

Werk Ostorerias			2002			
Work Categories	Weight	Jan	Feb	Mar		
1. Setting up	2.3	100.1	99.9	99.9		
2. Setting out	0.5	100.0	100.0	100.0		
3. Temporary works	0.5	100.0	100.0	100.4		
4. Site preparation, excavation & disposal, hardcore filling	5.8	100.0	100.0	100.0		
5. Concrete	20.2	100.5	100.5	100.5		
6. Reinforcement	9.2	100.0	102.5	102.5		
7. Formwork (coffrage)	7.8	100.0	100.0	100.4		
8. Blockwork	8.5	101.0	101.0	101.0		
9. Softwood joinery	4.5	100.0	100.4	100.4		
10. Ironmongery	0.5	100.0	99.8	99.8		
11. Metal openings	6.5	100.0	100.2	100.2		
12. Rendering to wall/ceiling (crépissage)	9.9	100.3	100.3	100.3		
13. Bed & screed to floor/roof	4.2	100.7	100.7	100.7		
14. Tiling	2.1	100.0	100.0	100.7		
15. Glazing	1.0	100.0	100.0	100.1		
16. Painting	5.2	100.0	100.2	100.2		
17. Plumbing/sanitary inst.	5.0	100.1	100.1	99.9		
18. Electrical installation	4.2	100.0	100.0	100.0		
19. Drainage	2.1	100.4	100.5	100.5		
OVERALL INDEX		100.3	100.5	100.		

# Table 4.2: Percentage change from previous month by work categories, January to March 2002

			2002			
Work Categories	Weight	Base to Jan	Jan to Feb	Feb to Mar		
1. Setting up	2.3	0.1	-0.2	0.0		
2. Setting out	0.5	0.0	0.0	0.0		
3. Temporary works	0.5	0.0	0.0	0.4		
4. Site preparation, excavation & disposal, hardcore filling	5.8	0.0	0.0	0.0		
5. Concrete	20.2	0.5	0.0	0.0		
6. Reinforcement	9.2	0.0	2.5	0.0		
7. Formwork (coffrage)	7.8	0.0	0.0	0.4		
8. Blockwork	8.5	1.0	0.0	0.0		
9. Softwood joinery	4.5	0.0	0.4	0.0		
10. Ironmongery	0.5	0.0	-0.2	0.0		
11. Metal openings	6.5	0.0	0.2	0.0		
12. Rendering to wall/ceiling (crépissage)	9.9	0.3	0.0	0.0		
13. Bed & screed to floor/roof	4.2	0.7	0.0	0.0		
14. Tiling	2.1	0.0	0.0	0.7		
15. Glazing	1.0	0.0	0.0	0.1		
16. Painting	5.2	0.0	0.2	0.0		
17. Plumbing/sanitary inst.	5.0	0.1	0.0	-0.2		
18. Electrical installation	4.2	0.0	0.0	0.0		
19. Drainage	2.1	0.4	0.1	0.0		
OVERALL CHANGE		0.3	0.3	0.0		

# Table 4.3: Net monthly contributions of work categories to the index, January to March 2002

			2002			
Work Categories	Weight	Base to Jan	Jan to Feb	Feb to Mar		
1. Setting up	2.3	0.00	-0.01	0.00		
2. Setting out	0.5	0.00	0.00	0.00		
3. Temporary works	0.5	0.00	0.00	0.00		
4. Site preparation, excavation & disposal, hardcore filling	5.8	0.00	0.00	0.00		
5. Concrete	20.2	+0.11	0.00	0.00		
6. Reinforcement	9.2	0.00	+0.23	0.00		
7. Formwork (coffrage)	7.8	0.00	0.00	+0.03		
8. Blockwork	8.5	+0.09	0.00	0.00		
9. Softwood joinery	4.5	0.00	+0.02	0.00		
10. Ironmongery	0.5	0.00	0.00	0.00		
11. Metal openings	6.5	0.00	+0.02	0.00		
12. Rendering to wall/ceiling (crépissage)	9.9	+0.03	0.00	0.00		
13. Bed & screed to floor/roof	4.2	+0.03	0.00	0.00		
14. Tiling	2.1	0.00	0.00	+0.02		
15. Glazing	1.0	0.00	0.00	0.00		
16. Painting	5.2	0.00	+0.01	0.00		
17. Plumbing/sanitary inst.	5.0	0.00	0.00	-0.01		
18. Electrical installation	4.2	0.00	0.00	0.00		
19. Drainage	2.1	0.01	0.00	0.00		
TOTAL	100.0	+0.27	+0.27	+0.04		

# Input Cost Index for the construction of a single storey house (Base: 4th Quarter 2001 = 100)

# Table 4.4: Quarterly average of monthly indices and percentage changes by work categories, January toMarch 2002

Work Categories	Weight	1st Qr 2002	% change from Base
1. Setting up	2.3	99.9	-0.1
2. Setting out	0.5	100.0	0.0
3. Temporary works	0.5	100.1	0.1
4. Site preparation, excavation & disposal, hardcore filling	5.8	100.0	0.0
5. Concrete	20.2	100.5	0.5
6. Reinforcement	9.2	101.7	1.7
7. Formwork (coffrage)	7.8	100.1	0.1
8. Blockwork	8.5	101.0	1.0
9. Softwood joinery	4.5	100.2	0.2
10. Ironmongery	0.5	99.8	-0.2
11. Metal openings	6.5	100.2	0.2
12. Rendering to wall/ceiling (crépissage)	9.9	100.3	0.3
13. Bed & screed to floor/roof	4.2	100.7	0.7
14. Tiling	2.1	100.2	0.2
15. Glazing	1.0	100.0	0.0
16. Painting	5.2	100.1	0.1
17. Plumbing/sanitary inst.	5.0	100.0	0.0
18. Electrical installation	4.2	100.0	0.0
19. Drainage	2.1	100.4	0.4
OVERALL INDEX AND CHANGE		100.5	0.5

	(Bas	(Base: 4th Quarter 1993 = 100)		(Base	e: 4th Qua	rter 2001	= 100)	
	1998	1999	2000	2001	2002			
January	115.2	118.6	120.4	124.9	100.3			
February	115.3	119.1	120.4	124.9	100.5			
March	115.3	119.1	120.5	125.0	100.6			
1st Quarter	115.3	118.9	120.5	124.9	100.5			
April	115.3	119.2	120.4	124.9				
Мау	115.5	119.2	120.4	124.9				
June	115.6	119.3	120.5	124.9				
2nd Quarter	115.5	119.3	120.5	124.9				
July	116.9	120.9	121.5	126.9				
August	117.5	121.0	121.6	127.4				
September	118.1	121.0	121.4	127.4				
3rd Quarter	117.5	120.9	121.5	127.2				
October	118.4	121.2	124.3	127.6				
November	118.4	120.5	124.4	128.4				
December	118.6	120.6	124.4	128.5				
4th Quarter	118.4	120.8	124.3	128.2				
Yearly average	116.7	120.0	121.7	126.3				
Change in the yearly average	2.9	2.8	1.4	3.8				

Table 5: Construction Price Index - January 1998 to March 2002

#### Description of the model used for establishing the Construction Price Index

The model used is a single storey (ground floor) detached house of 128.30 square metres (1,381 square feet) in floor area measured at plinth level to the external face of the external walls. The overall area is inclusive of 18.55 square metres (200 square feet) in respect of a garage.

It comprises two bedrooms, a living-dining room, a kitchen, w.c. bathroom and verandah with an attached garage. The building has concrete block walls, reinforced concrete flat roof, internal flush plywood doors, glazed metal openings, screeded floor and roof, tiling to floor and walls of w.c. and bathroom and kitchen worktop; the ceilings and walls are rendered and painted both internally and externally. Plumbing, sanitary installation and electrical installation are included as well as drainage which is to be connected to the sewerage system.

Provision has been made, in the form of more substancial foundations and of stub columns on the roof, for converting the single into a two-storey house eventually. Site works are restricted to spreading and levelling surplus excavated material around the site.

The Index excludes the cost of the building permit and the draughtman's fee; these two items represent 0.47 % and 1.30% of the total cost respectively.

It is assumed that although the house is not constructed by a contractor, the client has recourse to the services of a foreman.