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## Construction

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**Construction**

**11**



## 11.1 Introduction

11.1 The chapter, like the previous chapter, concerns gross fixed capital formation (GFCF) and the pricing of capital goods for Eurostat and OECD comparisons. Chapter 10 deals with the equipment goods price survey and the collection of prices for machinery and equipment and computer software. This chapter deals with the *construction price survey* and the pricing of construction projects. As the chapter explains, pricing a construction project involves collecting unit prices with which to value its components and summing the values obtained to arrive at a total price for the project. PPPs for construction are calculated with the total prices for a set of construction projects. The set covers three types of structures: *residential buildings*, *non-residential buildings* and *civil engineering works*.

11.2 Construction projects are basically unique products even within the same country. This makes the collection of internationally comparable and representative prices for construction both difficult and costly. The complexity and variability of construction projects means that the product specifications for the construction price survey have to be drawn up by construction experts. Moreover, the expertise needed to draw up the specifications is also required to price them. As Eurostat does not have the required expertise in house, it outsources the construction price survey to a firm of consultants (referred to as *EU consultants* in the chapter). National statistical institutes (NSIs) of participating countries do not normally have the required expertise either and contract out the pricing of construction projects to consultancy firms specialising in construction.

11.3 Eurostat and OECD comparisons are made with the prices actually paid in the countries participating in the comparison for a selection of comparable and representative products. Hence, the projects priced for a comparison of construction prices should be comparable across participating countries and representative of the price levels within them. The prices paid for the projects should be transaction prices. Transaction prices are the prices that purchasers actually pay for the projects to be built in working order at the time and the place required by the purchasers. The prices collected should also be consistent with the prices underlying the GFCF expenditures they are used to deflate – that is, they should be national annual averages that reflect the level of prices over the whole of the country and over the whole of the reference year.

11.4 The chapter explains how national annual purchasers' prices are collected for a comparable and representative set of construction projects within the framework of a Eurostat and OECD comparison.

## 11.2 General approach

11.5 There are three main types of construction price indices. The first, which is not a price index but a cost index, involves collecting the prices of a basket of inputs covering different labour skills (general labourer, bricklayer, carpenter, electrician, plumber, etc.), standard building materials (cement, sand, gravel, metal rods, bricks, etc.) and the hire of plant (trucks, bulldozers, excavators, graders, cranes, etc.).<sup>1</sup> The second, which is half way between a cost index and a price index, entails pricing a set of standard components or operations such as constructing so many square metres of brick wall or laying so many square metres of roofing tiles or installing a hot water boiler of a given capacity.<sup>2</sup> The third, which is a price index, requires pricing actual or model construction projects. Of the methods underlying these indices, only that of the third type of index is capable of generating the purchasers' prices required for Eurostat and OECD comparisons of construction prices.

<sup>1</sup> Construction cost indices generally do not reflect the full range of factors that determine market prices – factors such as overhead costs, preliminary expenses, sub-contractors' margins, prime contractor's profit (or loss), architects' and engineers' fees and non-deductible taxes on products.

<sup>2</sup> Construction price indices based on standard components or operations do not reflect all the factors that influence market prices. Although, for example, they include sub-contractors' margins, they will not include prime contractor's profit (or loss).

**Box 11.1:** Timetable for construction price survey of year t

Phase	Step	Who	When
<b>Preparation and planning</b>	01. Preparation of documentation for PPP Working Group meeting	EU consultant; Eurostat	Jul-Sep (t-1)
	02. PPP Working Group meeting: planning of survey	Countries; EU consultants; Eurostat; OECD	Nov (t-1)
	03. Preparation and distribution of project specifications and other survey materials	EU consultants; Eurostat	Jan-Apr (t)
<b>Price collection and reporting</b>	04. Price collection	Countries	May-Jul (t)
	05. Price file and sections 1 and 2 of survey report sent to Eurostat	Countries	Jul (t)
<b>Inter-country validation</b>	06. Data cleaning and checking	Countries; EU consultants	Aug (t)
	07. Calculation of 1 <sup>st</sup> Quaranta table	EU consultants; Eurostat	Sep (t)
	08. Analysis of 1 <sup>st</sup> Quaranta table	Countries; EU consultants	Sep-Nov (t)
	09. PPP Working Group meeting: discussion of interim results	Countries; EU consultants; Eurostat; OECD	Nov (t-1)
	10. Calculation of 2 <sup>nd</sup> Quaranta table	EU consultants; Eurostat	Dec (t)
	11. Analysis of 2 <sup>nd</sup> Quaranta table	Countries; EU consultants	Dec (t)-Mar (t+1)
	12. Calculation of 3 <sup>rd</sup> Quaranta table	EU consultants; Eurostat	Mar (t+1)
	13. Analysis of 3 <sup>rd</sup> Quaranta table	Countries; EU consultants	Mar-Apr (t+1)
	14. Calculation of final Quaranta table	EU consultants; Eurostat	Apr (t+1)
	15. Approval of survey results and closure of validation	Countries; EU consultants	Apr (t+1)
<b>Evaluation</b>	16. Section 3 of survey report sent to Eurostat	Countries	Apr (t+1)
	17. Validated survey results used in calculation of preliminary PPPs for GDP for t	Eurostat	Jun (t+1)
	18. PPP Working Group meeting: evaluation of survey results	Countries; EU consultants; Eurostat; OECD	Nov (t+1)

11.6 The objective of Eurostat and OECD comparisons of construction prices is to compare the purchasers' prices actually paid for comparable and representative buildings and civil engineering works across participating countries. In practice the complexity and the country-specific nature of the products of the construction industry make it difficult to achieve both complete comparability and representativity in the same comparison. In the comparison of consumer prices, comparability and representativity are obtained when countries price both their own representative products - that is, the products they have proposed for the product list - and the representative products of others - that is, the products other countries have proposed for the product list. Given the number of countries being compared, the types of structures covered and the fact that the pricing has to be contracted out

to experts, it would be prohibitively expensive to apply this approach in the construction price survey. Another approach has to be employed instead.

11.7 The main approaches to international comparisons of construction prices are as follows. First, an identical structure can be priced by experts in each country. With this approach, the structures and their prices will be comparable across countries but not necessarily representative of any country or group of countries. Second, the experts can provide the price for a typical structure of a specified type in their country. With this approach, the structures and their prices will be representative of each country although not necessarily comparable across countries. Third, a standard structure, that may be modified to accommodate different national circumstances and practices, can be priced by experts in each country. With this approach, the structures and their prices will be less comparable across countries but more representative of each country. Of these approaches, the first emphasises comparability, the second representativity and the third is a compromise between the two. It is the third approach - the pricing of standard structures or standard construction projects - that Eurostat and the OECD have adopted for the construction price survey.

### 11.3 Survey process

11.8 The construction price survey is conducted every year.<sup>3</sup> It has four phases: the preparation and planning phase, the price collection and price reporting phase, the inter-country validation phase and the evaluation phase. Each phase has a number of steps. These are listed in the timetable in Box 11.1 together with who carries out the step – countries, EU consultants or Eurostat - and the month when the step is to be implemented. From the timetable it can be seen that the survey takes 24 months to complete. Price collection takes three months – May, June and July of the reference year – and inter-country validation takes nine months. The validation period is long in order to ensure that the unit prices with which the components of the standard construction projects are valued – and which themselves are composite prices – are comparable.

11.9 It is during the validation phase that the EU consultants make missions to groups of participating countries to review with their construction experts the component specifications of the standard construction projects and the unit prices reported. The groups are small, comprising between two to four countries, usually neighbours, and each group is visited once every two years. The missions help to establish whether countries in the group have interpreted and priced the component specifications the same way. The discussions also help to clarify and update the component specifications. More generally, the missions complement the inter-country validation providing the EU consultants with additional means of improving the quality and comparability of survey data across participating countries.

11.10 Unlike the price surveys for consumer goods and services and the equipment goods price survey, the construction price survey has no pre-survey phase. The pre-survey approach to updating product lists is not applicable to the component specifications of the standard construction projects. A programme of assessment and renewal, whereby each standard construction project is reviewed in turn, is followed instead. Every year, the EU consultants, in consultation with the construction experts of participating countries, examine the specifications for one of the standard construction projects with the object of modernising them. This may mean modifying the existing specifications, replacing the specifications with other specifications for the same standard construction project or providing specifications for a different standard construction project. The changes proposed by the EU consultants are presented to the PPP Working Group for final discussion and approval at the annual meeting that Eurostat convenes each November.

11.11 In the years that they are not being reviewed, the component specifications for the standard construction projects are revised to accommodate the developments that the country construction experts encounter during price collection and validation.

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<sup>3</sup> The OECD has surveyed construction prices once every three years since 1990. Prior to 1990 it was once every five years.

## 11.4 Bills of quantities

### 11.4.1 Standard construction projects

11.12 Countries participating in Eurostat and OECD construction price comparisons are required to price a number of standard, but fictitious, construction projects covering different types of residential buildings, non-residential buildings and civil engineering works. The standard construction projects are listed by basic heading in Box 11.2. The list reflects the view of construction experts that representativity - when assessed in terms of variation among countries - is an important consideration for residential buildings, but less important for non-residential buildings and even less so for civil engineering works. The standard construction projects for the single-family house are specific to individual countries or groups of countries while the projects for other constructions are, with the exception of a factory building, common to all. Countries are expected to price a minimum of seven projects in total – at least three residential buildings, both non-residential buildings and both civil engineering works.

#### Box 11.2: Standard construction projects by basic heading

<b>15.02.11.0 Residential buildings</b>	
01.	European single-family house
02.	Portuguese single-family house
03.	Nordic single-family house
04.	Apartment block
05.	<i>North American single-family house</i>
06.	<i>Japanese single-family house</i>
<b>15.02.21.0 Non-residential buildings</b>	
07.	European factory building
08.	Office building
09.	<i>Japanese factory building</i>
<b>15.02.31.0 Civil engineering works</b>	
10.	Asphalt road
11.	Bridge

Countries working with Eurostat have to price projects 01, 04, 07, 08, 10 and 11. They also have to price either project 02 or project 03 or both. The choice of pricing projects 05, 06 and 09 is restricted to countries working directly with the OECD.

11.13 Although not real structures, the standard construction projects are based on actual construction methods and practices. Like actual construction projects, they consist of a number of major components or chapters, such as earthworks, concrete, masonry, roofing, etc. Each major component comprises a number of elementary components, such as: the mechanical excavation of the terrain; the mechanical excavation of foundation trenches; the supply, transport, dumping and compacting of spoil for foundation trenches; the supply, transport, dumping and compacting of crushed aggregate for foundation trenches; etc. Each standard construction project has its major components and their elementary components itemised and defined in a product specification called a *bill of quantities*.<sup>4</sup> In addition to detailing the components, the bill of quantities also provides a preamble describing the project, its location and other factors that need to be taken into account when pricing it. Each bill is accompanied by a set of technical drawings. There are as well pricing

<sup>4</sup> A common classification of major components is followed in Eurostat and OECD bills of quantities. It consists of nine major components: earthworks, concrete, masonry, roofing, wood and metal joinery, finishings, mechanical installations, electrical installations and drainage.



guidelines. These are common to all the bills of quantities and reiterate the explanations and instructions given in this chapter.

**Box 11.3:** An example of a major component and its elementary components

Item specification	Unit	Quantity	Unit Price (national currency)	Total Price (national currency)
<b>3. Masonry</b>				
3.1 Ground floor double-skin external wall:				
➤ 20 cm sand-lime brickwork + 11 cm facing brickwork, inclusive of pointing and acid cleaning	m <sup>2</sup>	257	17	4369
➤ Plastering	m <sup>2</sup>	257	8	2056
3.2 Upper floors double skin external wall:				
➤ 11 cm sand lime brickwork + 10 cm facing brickwork, inclusive of pointing and acid cleaning	m <sup>2</sup>	413	18	7434
➤ Plastering	m <sup>2</sup>	413	8	3304
3.3 Gable ends, 11 cm facing bricks, inclusive of pointing and acid cleaning	m <sup>2</sup>	625	18	11250
3.4 Fair-finish 7 cm plaster block work	m <sup>2</sup>	585	7	4095
<b>Total</b>				<b>32508</b>

**Box 11.4:** An example of a summary sheet detailing major components

Major component	(national currency)
01. Earthworks	2489
02. Concrete	28985
03. Masonry.	<b>32508</b>
04. Roofing	16220
05. Carpentry, joinery, steel and metal working	29175
06. Finishings	35097
07. Mechanical installations	19602
08. Electrical installations	10182
09. Drainage	715
A. Overall price of work done (01 + 02 + ..... + 11)	174973
B. Architect's and engineer's fees (5% <sup>1</sup> of A)	8749
<b>Total price without VAT (A + B)</b>	<b>183722</b>

<sup>1</sup> Standard rate prevailing in the country. The 5% is for illustration only.

11.14 For pricing purposes, the elementary components of the standard projects are detailed in bills of quantities as shown in Box 11.3. The total price for the elementary component is computed by multiplying the unit price in national currency units (NCUs) by the quantity specified. For example, the total price of brickwork for the ground floor external wall as specified in Box 11.3 is 4,369 NCUs – that is, 257 square metres multiplied by a unit price of 17 NCUs per square metre. By summing the total prices of its elementary components, a total price can be determined for each major component. The total price for masonry as detailed in Box 11.3 is 32,508 NCUs. By summing the total prices of the major components, an overall price for work done can be obtained. Each bill of quantity has a summary sheet, such as that in Box 11.4, specifically for this purpose. The overall price for work done is not the final price of the project. It needs to be augmented by architects' and engineers' fees and by non-deductible taxes on products in order to arrive at the desired purchasers' price. But, as explained below, countries are required to exclude non-deductible VAT and only supply the overall price for work done and the architects' and engineers' fees when completing the summary sheet.

#### 11.4.2 Flexibility in interpretation

11.15 For each standard construction project the same bill of quantities is priced in each country so that, in principle, all countries pricing a specific bill of quantities are pricing a comparable product. In practice, this is not necessarily so. Materials and methods of construction can vary between countries. National standards and regulations can also differ between countries. Some flexibility of interpretation has to be allowed if countries are to provide prices that are representative.

11.16 The general rule to be followed with regard to flexibility of interpretation is that, if strict adherence to the specification means that the component cannot be easily priced or leads to special pricing, a more readily available substitute should be priced instead because the aim of the exercise is to avoid unrepresentative prices as far as possible. For example:

- Wall thicknesses are often governed by the sizes of bricks and, since standard measurements of bricks are not identical in all countries, each country should price the national standard brick which gives the wall thickness closest to that specified.
- The type of brick may also vary from country to country. Countries should price the type of brick which for them is most usual.
- Standard measurements of doors, windows and other joinery work are not the same in all countries. Countries should price the national standard measurements which are closest to those specified.
- National standards and regulations applicable to electrical and other fittings also differ. Countries should comply with their own regulations when pricing these items.

11.17 Care should be taken that flexible interpretation does not become too liberal and result in marked differences in quality or in a different construction being priced. Substituting concrete bricks for clay bricks is allowed, replacing a brick wall by one of reinforced concrete is not. The dividing line between these two extremes is a grey area and it is left to the individual countries themselves to decide what can or can not be substituted. Usually substitutions are acceptable when the components affected represent only a small share of the total price and the basic features of the construction remain unchanged. When substitutions are made, they should be clearly identified and explained in the bill of quantities.

## 11.5 Rolling survey approach

11.18 Experience shows that about 50 per cent of the elementary components specified in a bill of quantities account for around 90 per cent of the overall price. It has also been established that PPPs based on this 50 per cent do not differ significantly from PPPs based on all elementary components. By identifying these elementary components or key items and pricing only them, the response burden of the construction price survey can be eased without a serious loss of reliability. By reducing the number of bills of quantities priced for its comparisons from twelve to seven and by adopting a rolling survey approach to key items, Eurostat has been able to return to collecting construction prices annually without additional cost. Annual construction price surveys were reintroduced in 2009.<sup>5</sup>

11.19 For this to happen, the EU consultants chose a set of key items for each of the bills of quantities priced for Eurostat comparisons. Selection was based on the item's contribution to the bill of quantities' total price and on its variability across countries. Items with large percentage shares of the total price were identified and, if their variability across countries was low, selected. Items with a large share and high variability were not selected. The EU consultants made sure that the key items were spread over the major components comprising the bill of quantities so that they would not all come from one major component or cover the same type of elementary component. They also made sure that the values of the key items chosen summed to between 60 to 70 per cent of the bill of quantities' total price. As a result, the 684 elementary components making up the eight bills of quantities currently priced for Eurostat comparisons were reduced by 82 per cent to 123 key items.

### Box 11.5: Pricing schedule for Eurostat construction price surveys

Bill of quantities	Year t	Year t+1	Year t+2	Year t+3
<b>15.02.11.0 Residential buildings</b>				
01. Detached house	All items (110)	Key items (23)	All items (110)	Key items (23)
02. Portuguese house	Key items (23)	All items (93)	Key items (23)	All items (93)
03. Nordic house	Key items (23)	All items (81)	Key items (23)	All items (81)
04. Apartment	Key items (14)	All items (108)	Key items (14)	All items (108)
<b>15.02.21.0 Non-residential buildings</b>				
07. Factory building	All items (135)	Key items (9)	All items (135)	Key items (9)
08. Office building	Key items (17)	All items (114)	Key items (17)	All items (114)
<b>15.02.31.0 Civil engineering works</b>				
10. Asphalt road	Key items (5)	All items (16)	Key items (5)	All items (16)
11. Bridge	All items (27)	Key items (9)	All items (27)	Key items (9)
Total number of items (if Portuguese house priced)	331	372	331	372
Total number of items (if Nordic house priced)	331	360	331	360

Countries have to price either the Portuguese house or the Nordic house or both. The item numbers are based on 2011 bills of quantities. They may vary over time due to modifications to the bills of quantities or the introduction of new bills of quantities.

<sup>5</sup> Up until 2001, Eurostat surveyed construction prices every year. After 2001, between 2002 and 2009, Eurostat priced the construction projects every two years - in 2003, 2005, 2007 and 2009 – as part of the exercise to reduce the overall cost of the PPP Programme. In 2009, acting on the proposals of the *Task Force for Improving the Construction Survey Methodology 2008*, Eurostat reverted to conducting the construction price survey every year.

11.20 Previous experience with key items suggested that, even when only key items are priced, PPPs should still be calculated using total prices based on all elementary components.<sup>6</sup> To enable this, the unit prices of non-key items in a bill of quantities are assumed to move in line with the unit prices of key items as measured by the overall change in key item total prices between two consecutive surveys. For example, if the total price estimated with key items for a bill of quantities in the year  $t$  is 100 and the key item total price for the same bill of quantities in year  $t+1$  is 105, the increase is five per cent and the unit prices of the non-key items in the bill of quantities for  $t$  are grossed up by five per cent and recorded in the bill of quantities for  $t+1$ . The total price for the bill of quantities in the year  $t+1$  can then be derived using the unit prices of both key elementary components and non-key elementary components.

11.21 Previous experience also suggests that prices for non-key items should be collected on a regular if less frequent basis. Eurostat has adopted a rolling survey approach to do this. It involves pricing key items every year and non-key items every other year. In other words, a bill of quantities is fully priced once every two years. Not all bills of quantities are fully priced in the same year in order to spread the workload evenly over the two years. A pricing schedule is given in Box 11.5. For each bill of quantities, it shows when all items are to be priced and when only key items are to be priced. The total number of items to be priced each year is also shown. From the schedule it can be seen that for each basic heading at least one bill of quantities is fully priced each year.

## 11.6 Collection and reporting of prices

### 11.6.1 Prices to be collected

11.22 When pricing the bills of quantities, a distinction has to be drawn between *producer's cost* and *purchaser's price*. The producer's cost of a structure is what it costs the contractor to build it. The purchaser's price of a structure is what the purchaser pays the contractor for it. The prices that countries should provide for the standard construction projects are purchasers' prices - that is, the prices that purchasers would pay for the standard construction projects if they were actually built and marketed.

11.23 The unit prices used in the bills of quantities must cover not only the producer's direct cost for each of the specified elementary components (such as materials, labour, hire of equipment, sub-contractors' fees), but also the contractor's profits (or losses), and the general expenses (including share of main office overheads) and preliminary expenses (including the cost of site preparation) connected with the construction. The unit prices do not include architects' and engineers' fees and non-deductible VAT. These are added after the overall price of work has been established. Nor do the unit prices include the expenditure incurred for the purchase of the land. But in this case no addition is made to the overall price of work either for the cost of the land itself or for the financial and other costs associated with the transfer of ownership.

- *General and preliminary expenses* comprise overhead costs, start up costs and contractor's profit (or loss). Although they are not specified in the bills of quantities, these costs are to be included in the unit prices all the same. Annex 11.1 lists the items which general and preliminary expenses usually cover. The general guideline to be followed by countries with regard to such costs is that they are to be included if the contractor is obliged by law to pay them or required by the standard contracting practice of the country to pay them.
- *Architects' fees and engineers' fees* are percentage additions made after all the components specified in the bill of quantities have been priced and summed. The fees are to cover both the realisation of the project and the supervision of works. Annex 11.2 details the services

<sup>6</sup> Eurostat introduced *reduced bills of quantities* during the 2001 construction price survey which were retained for the 2003, 2005 and 2007 construction price surveys. Country construction experts were required to price only those elementary components that were identified as key components in the reduced bills of quantities. Many of the experts did not like the approach as it did not allow them to "feel" whether or not the price they were building up for the bill of quantities was realistic for prevailing market conditions. They could not, for example, check the total price of reduced bill of quantities against the prices for actual projects.

which the fees should normally cover though these may be subject to some variation in line with standard practice in the country concerned.

- *Non-deductible VAT* entails actual expenditure for the purchaser and should be covered in the purchasers' prices of the standard construction projects. Usually it is levied on the overall cost of the construction - that is, the overall price of work done plus architects' and engineers' fees - and treated as a percentage addition. VAT is wholly or partly deductible for most purchasers of capital goods and so the standard rate of VAT is not the same as the rate based on what was actually paid. The experts pricing the bills of quantities will not know the actual rate of VAT paid. And the information will not be available at the time the bills of quantities are priced. **Countries are required to report the prices of the standard construction projects without VAT.** Following the close of the survey year, the national statistical agencies that are responsible for their national accounts will report the rate of non-deductible VAT on buildings and civil engineering works for the survey year - that is, they will report the rate of VAT actually paid by purchasers of buildings and civil engineering works in the survey year. Eurostat will apply this global rate to adjust the PPPs calculated with project prices without VAT to reflect the inclusion of non-deductible VAT.<sup>7</sup>

11.24 Countries are required to report unit prices that are *national averages* - that is, prices that reflect the level of prices over the whole of the national territory and take account of any regional disparities in prices. In principle, the national unit prices should be the weighted averages of regional unit prices, with regional unit prices being weighted by regional shares of national construction output. In practice, this may not be possible and the national unit prices will have to be estimated. How this is done should be clearly explained on the price reporting form.

11.25 Countries should also report unit prices that are *annual averages* - that is, prices that reflect the level of national prices over the whole year. But, as it would be too costly to record prices throughout the year, countries are required to provide the national average prices for the months the construction price survey is conducted - that is, May, June and July of the survey year.<sup>8</sup> As long as inflation is low, prices in these months will be good approximations of mid-year prices which are acceptable alternatives to annual averages.

## 11.6.2 Sources of prices

11.26 The unit prices with which to value the elementary components of the bills of quantities can be obtained either from actual bills of quantities that have been valued for tenders submitted by construction companies or from one of the computerised systems of unit costs that major consultancy firms and research institutes maintain for the construction industry. If the first source is adopted, only unit prices from tenders that have been successful - or from tenders that can be considered realistic because they would permit the carrying out of work in good condition - should be used to value the standard construction projects. Tenders may vary by quite considerably and so not reflect actual prices accurately. Extreme prices, be they high or low, must be excluded.

11.27 If the second source is employed, the standard construction projects will be valued at resource cost and not at purchasers' prices. It is necessary to adjust the underlying unit costs to unit prices using the total prices of successful tenders to establish the level to which the unit costs have to be raised. Of the two sources, the second is preferable to the first because it provides internationally comparable unit prices. Total tender prices may be realistic, but the unit prices used to value individual elementary components may not be. Contractors modify unit prices - understating some, overstating others - for a number of reasons such as improving their cash flow. The first objective of the pricing exercise is to obtain internationally comparable total prices for the standard construction projects so either source is acceptable.

<sup>7</sup> This approach is not followed by the OECD. Countries participating in OECD comparisons are expected to report prices that include the actual rate of non-deductible tax on products paid.

<sup>8</sup> Countries participating in OECD comparisons report mid-year (July) prices.

### 11.6.3 Reporting prices

11.28 The bills of quantities are also the price reporting forms. They are provided to countries in an electronic file. When filling out the bills of quantities, countries need only to enter the unit prices for the elementary units and the percentages that need to be added for architect's and engineer's fees as the bills of quantities are programmed to complete themselves. Completed bills of quantities are to be returned to Eurostat via eDAMIS.

### 11.6.4 Survey report

11.29 At the same time as they submit their prices, participating countries are required to complete a survey report and send it to Eurostat. Like the prices, the report is transmitted through eDAMIS. The standard report form for the construction price survey is shown in Box 11.6. The form has three sections, each covering a survey phase: the price collection phase, the intra-country validation phase and the inter-country validation phase. All sections have two questions in common: one on timing, organisation and resources used; the other on problems encountered. Otherwise the questions are specific to survey phase under consideration.

11.30 Only sections 1 and 2 dealing with price collection and intra-country validation are to be completed and sent with the price data. These sections assist Eurostat and the EU consultants to evaluate the quality of the prices received. Section 3 on inter-country validation is to be completed and submitted to Eurostat through eDAMIS after the inter-country validation is finished and countries have approved the survey results. This section helps Eurostat and the EU consultants to assess the effectiveness of the inter-country validation.

## 11.7 Validation of prices

### 11.7.1 Intra-country validation

11.31 The bills of quantities are designed to provide a single total price – the national purchasers' price for May/June/July of the survey year - for each standard construction project. Since bills of quantities are priced only once within a country, countries cannot carry out the intra-country edits that they are required to make for consumer products prior to reporting prices. Unlike the price surveys for consumer products and equipment goods, the product list for the construction price survey is comparatively stable over time. Unless they have just undergone the periodic review, bills of quantities do not change radically from one survey to the next allowing countries to employ another edit instead.

11.32 This involves taking the summary sheets of the projects priced in the current survey and comparing them with the summary sheets for the same projects from the previous survey. The object of the review is to see whether the contribution to the total price of each major component is approximately the same in both surveys and, if it is not, to check the unit prices of its elementary components across the two surveys. There are three possible outcomes: both sets of unit prices are correct, the unit prices of the previous survey are wrong or the unit prices of the current survey are wrong. If the unit prices of the current survey are wrong, they should be corrected. If the unit prices are correct for both surveys or if the unit prices for the previous survey are wrong, EU consultants should be informed of this at the time of reporting prices. This will avoid additional response burden on countries when the edit is repeated by the EU consultants.

**Box 11.6: Standard report form construction price surveys**

<b>Country:</b>	<b>Survey year:</b>
<b>Note: Please enter information in this survey report that is <u>complementary</u> to your PPP Inventory and describes specific aspects related to this survey, especially if they are different from what is in the Inventory. If the PPP Inventory describes accurately the procedures for a certain section, it suffices to make a reference.</b>	
<b>1. SURVEY</b>	
1.1 <i>Timing, organisation and resources used</i> (Describe when and how the price collection was carried out and how much (human or other) resources were spent. Describe also the preparations for the price collection (translation, etc.).)	
1.2 <i>Sources of information</i> (Describe the sources of information for the prices reported. List all direct costs (materials, labour, etc.) that are included in the unit prices. Describe which general and preliminary expenses are taken into account in the unit prices and how architects' and engineers' fees are estimated.)	
1.3 <i>Problems encountered and lessons learned</i> (Describe any problems encountered during the survey, solutions found and lessons learned for the next survey (for individual basic headings, if needed).)	
<b>2. INTRA-COUNTRY VALIDATION</b>	
2.1 <i>Timing, organisation and resources used</i> (Describe when and how the intra-country validation was carried out (before the submission of data to Eurostat) and how much (human or other) resources were spent. Provide the date of the first delivery of the data file through eDAMIS and any potential problems related to the transmission.)	
2.2 <i>Checks performed and changes made</i> (Describe the validation checks performed before submitting the data file to Eurostat via eDAMIS.)	
2.3 <i>Problems encountered and lessons learned</i> (Describe any problems encountered during the intra-country validation, solutions found and lessons learned for the next survey (for individual basic headings, if needed).)	
<b>3. INTER-COUNTRY VALIDATION</b>	
<b>To be filled after the validation process as an update of the earlier version of the survey report.</b>	
3.1 <i>Timing, organisation and resources used</i> (Describe when and how the inter-country validation was carried out (after the submission of data to Eurostat) and how much (human or other) resources were spent.)	
3.2 <i>Checks performed and changes made</i> ([1] Describe the validation checks performed, on the basis of the Quaranta tables and other validation material made available, in analysing your country's data against those of other countries. List the countries you compare your prices against. [2] Describe the procedures followed in responding to the validation queries. [3] Describe the main changes (deletions, modifications or additions) made to your data and the reasons for these changes.)	
3.3 <i>Problems encountered and lessons learned</i> (Describe any problems encountered during the inter-country validation, solutions found and lessons learned for the next survey (for individual basic headings, if needed).)	

### 11.7.2 Inter-country validation

11.33 The Quaranta editing procedure is used for the inter-country validation of the prices provided by the construction price survey. The procedure, which is designed to establish the comparability of the items priced by examining the price ratios their prices generate, is explained in detail in Annex IV. It is employed to detect outliers among the total prices for the standard construction projects priced for each basic heading. It is also employed to find outliers among the unit prices collected for the elementary components of each standard construction project. In other words, two sets of Quaranta tables are generated. One set by basic heading in which the total prices of the standard construction projects are compared. The other set by standard construction project in which the unit prices of the project's elementary components are compared. In the later set of tables, the standard construction project takes the place of the basic heading.<sup>9</sup>

11.34 From the timetable in Box 11.1, it can be seen that there are three rounds of inter-country validation. The first round focuses on outliers among the unit prices of elementary components; the second and third rounds focus on outliers among the total prices of projects. Not all outliers identified among the unit prices in the first round of validation are verified. The EU consultants concentrate on outliers among the unit prices of elementary components that have a high weight and can influence the total price significantly. These are referred back to the countries reporting them for correction or confirmation that they are correct. Outliers among total prices identified in the second or third round of validation require the unit prices underlying them to be revisited. This time the EU consultants search for suspect unit prices, which may not necessarily be identified as outliers, among the unit prices for principal elementary components. Suspect unit prices are sent back to the countries reporting them. As in the first round of validation, countries are required either to correct the unit prices or to confirm that they are correct.

11.35 After three rounds of validation, the final Quaranta tables are produced. These contain the final results of the construction price survey and are sent to the NSIs of participating countries for approval.

11.36 Since 2011 the validation of the construction price survey is performed in the Validation Tool. This is a web-based tool, developed to help the participating countries to compare their price levels using Quaranta tables. It is also possible to export tables into Excel format for further editing and verification. During validation, the EU consultants insert in the Validation Tool specific questions to the various countries. The latter are able to reply online and the outcome is visible to all users.

## 11.8 Adjustment for non-deductible VAT

11.37 Producers are required to charge VAT on their products to most of their customers. Before paying the VAT to the tax authorities they can deduct the VAT paid by them on most of the goods and services they purchased in the course of the production process. Hence, most of the VAT paid on capital goods is deductible. Even so, some producers are exempt from charging VAT and therefore cannot deduct any. In addition, VAT rates differ from product to product and some products can be exempt or zero-rated.

11.38 In the national accounts, GFCF is recorded at purchasers' prices and includes all non-deductible VAT paid by purchasers. For the reasons given above, the rate of non-deductible VAT – that is, the rate of VAT purchasers actually pay – is lower than the rate of VAT specified by the tax authorities. For the PPPs to be consistent with the national accounts expenditure values, the PPPs for construction should reflect the level of non-deductible VAT paid. However, it is not possible to collect the rates of non-deductible VAT paid by purchasers directly.

<sup>9</sup> The Quaranta editing procedure requires PPPs to be calculated with the prices being validated. The PPPs in the Quaranta tables produced for Eurostat and OECD comparisons are calculated by the Étető-Köves-Szulc (EKS) method. In the absence of actual weights for products, quasi-weights, which distinguish between representative and unrepresentative products, are used instead. The PPPs in the Quaranta tables comparing the total prices of standard construction projects within a basic heading are calculated with equal quasi-weights – that is, no distinction is made between representative and unrepresentative products. Actual weights, however, are available for the elementary components of the standard construction projects. And they are used to calculate the PPPs in the Quaranta tables comparing the unit prices of elementary components within a standard construction project. How actual weights, rather than quasi-weights, are used to calculate PPPs is explained in Chapter 6, Section 6.4.1.



11.39 As explained in Sections 11.4.1 and 11.6.1, participating countries report prices for the elementary components that exclude VAT. In a separate exercise, Eurostat collects from the countries on an annual basis the actual rates of non-deductible VAT for construction broken down by three basic headings: *residential buildings*, *non-residential buildings* and *civil engineering works*. The rates are used to adjust the PPPs from the construction price survey for the three basic headings. After adjustment the PPPs reflect the required inclusion of non-deductible VAT.

### Annex 11.1: Coverage of general and preliminary expenses

***The following are among the items not specified in the bills of quantities, but the cost of which should be included in the unit prices:***

- The taking out of a builder's all-risk insurance which includes public liability cover, contractor's liability cover, fire insurance, earthquake insurance, and any other cover or insurance usually required by the standard contract.
- The giving and placing of all notices and notifications, the obtaining of the necessary permits, the paying of all associated charges and any other statutory fees or local taxes that may be required.
- The setting out of the works, including a set-out guide for subcontractors, and the paying of any registered surveyor's fees.
- The provision of a temporary power supply and the paying of all charges associated with its connection and use.
- The provision of a temporary water supply and the paying of all charges associated with its connection and use.
- The provision of a temporary telephone and the paying of all charges associated with its connection and use.
- The provision and maintenance of temporary toilet and washing facilities and the paying of all associated charges.
- The provision of a site office, a mess-room or other accommodation for the workers, and facilities for the storage of material and tools, and their subsequent removal on completion of the works.
- The provision and maintenance of a suitably placed job sign board and its subsequent removal on completion of the works.
- The provision and maintenance of competent managers or foremen to supervise the works.
- The provision and maintenance of any temporary fences or barriers required for the security of the works or for safety precautions.
- The provision of temporary scaffolding and trestles.
- The provision of a banker's guarantee or a performance bond as usually required by the standard contract.
- The removal of all rubbish from site as it accumulates and at the completion of the works.
- The cleaning of the building, inside and out, and the removal of all stains, etc., to the satisfaction of the supervisor.
- The protection of other property from damage.
- The share of main office overheads.
- Other preliminary expenses not elsewhere specified:
  - Provision of working drawings,
  - Plant which is not readily allocated to specific work items (such as a tower crane),
  - Furnished office for clerk of works (including telephone, telephone charges and heating),
  - Temporary roads or hard standing,
  - Compliance with statutory requirements in relation to working conditions,
  - Profit (loss) of the contractor.

**Annex 11.2: Coverage of architects' and engineers' fees**

<b>Preliminary Services</b>
<p><b>Work stage A: Inception</b></p> <ul style="list-style-type: none"> <li>• Discuss the client's requirements including timescale and any financial limits; assess these and give general advice on how to proceed; agree the architect's services.</li> <li>• Obtain from the client information on ownership and any lessors and lessees of the site, any existing buildings on the site, boundary fences and other enclosures, and any known easement, encroachments, underground services, rights of way, rights of support and other relevant matters.</li> <li>• Visit the site and carry out an initial appraisal.</li> <li>• Advise on the need for other consultants' services and on the scope of these services.</li> <li>• Advise on the need for specialist contractors, sub-contractors and suppliers to design and execute part of the works to comply with the architect's requirements.</li> <li>• Advise on the need for site staff.</li> <li>• Prepare where required an outline timetable and fee basis for further services for the client's approval.</li> </ul> <p><b>Work stage B: Feasibility</b></p> <ul style="list-style-type: none"> <li>• Carry out such studies as may be necessary to determine the feasibility of the client's requirements; review with the client alternative design and construction approaches and cost implications; advise on the need to obtain planning permissions, approvals under building acts or regulations, and other similar statutory requirements.</li> </ul>
<b>Basic Services</b>
<p><b>Work stage C: Outline proposals</b></p> <ul style="list-style-type: none"> <li>• With other consultants where appointed, analyse the client's requirements; prepare outline proposals and an approximation of the construction cost for the client's preliminary approval.</li> </ul> <p><b>Work stage D: Scheme design</b></p> <ul style="list-style-type: none"> <li>• With other consultants where appointed develop a scheme design from the outline proposals taking into account amendments requested by the client; prepare a cost estimate; where applicable give an indication of possible start and completion dates for the building contract. The scheme design will illustrate the size and character of the project in sufficient detail to enable the client to agree the spatial arrangements, materials and appearance.</li> <li>• With other consultants where appointed, advise the client of the implications of any subsequent changes on the cost of the project and on the overall programme.</li> <li>• Make where required application for planning permission. The permission itself is beyond the architect's control and no guarantee that it will be granted can be given.</li> </ul> <p><b>Work stage E: Detail Design</b></p> <ul style="list-style-type: none"> <li>• With other consultants where appointed, develop the scheme design; obtain the client's approval of the type of construction, quality of materials and standard of workmanship; co-ordinate any design work done by consultants, specialist contractors, sub-contractors and suppliers; obtain quotations and other information in connection with specialist work.</li> <li>• With other consultants where appointed, carry out cost checks as necessary; advise the client of the consequences of any subsequent change on the cost and programme.</li> <li>• Make and negotiate where required applications for approvals under building acts, regulations or other statutory requirements.</li> </ul> <p><b>Work stages F and G: Production information and bills of quantities</b></p> <ul style="list-style-type: none"> <li>• With other consultants where appointed, prepare production information including drawings, schedules and specification of material and workmanship; provide information for bills of quantities, if any, to be prepared: all information complete in sufficient detail to enable a contractor to prepare a tender.</li> </ul> <p><b>Work stage H: Tender action</b></p>

- Arrange, where relevant, for other contracts to be let prior to the contractor commencing work.
- Advise on and obtain the client's approval to a list of tenderers.
- Invite tenders from approved contractors; appraise and advise on tenders submitted. Alternatively, arrange for a price to be negotiated with a contractor.

**Work stage I: Project planning**

- Advise the client on the appointment of contractor and on the responsibilities of the client, contractor and architect under the terms of the building contract; where required prepare the building contract and arrange for it to be signed by the client and the contractor; provide production information as required by the building contract.

**Work stage J: Operations on site**

- Administer the terms of the building contract during operations on site.
- Visit the site as appropriate to inspect generally the progress and quantity of the work.
- With other consultants where appointed, make where required periodic financial reports to the client including the effect of any variations on the construction cost.

**Work stage K: Completion**

- Administer the terms of the building contract relating to the completion of the work.
- Give general guidance on maintenance.
- Provide the client with a set of drawings showing the building and the main lines drainage; arrange for drawings of the services installations to be provided.

