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MARITIME AND PORT SECURITY IN SOUTH AMERICA: IMPLEMENTATION COSTS

This edition of the Bulletin is based on a document prepared by ECLAC and the Technical Coordination Committee of the presidential initiative for Regional Infrastructure Integration in South America (IIRSA), which is composed of the Inter-American Development Bank (IDB), the Andean Development Corporation (ADC) and the Financial Fund for the Development of the River Plate Basin (FONPLATA). The document was prepared as a joint activity on maritime and port security in South America in the context of the IIRSA sectoral integration process in relation to operational systems for maritime transport. It served as an input for the meeting on that subject held by representatives of the authorities of the South American countries in Montevideo, Uruguay, on 22 June 2004.

This edition presents the results of the implementation cost assessment for the new compulsory regulations for maritime and port security of the International Maritime Organization (IMO) and also considers the costs of the voluntary measures.

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THE IMO INTERNATIONAL SHIP AND PORT FACILITY SECURITY CODE (ISPS)

The measures contained in the code are in five main categories, relating to: (a) governments; (b) vessels; (c) shipping companies; (d) ports; and (e) required documents and certifications.

This paper concentrates on the measures affecting governments and ports and the required documents and certifications relating to containerized trade.

The cost assessment is based on a “model or standard terminal”. This is a terminal that operates 300.000 TEUs (twenty-foot equivalent units, the measurement unit equivalent to a twenty-foot container) annually, with an annual maximum of 400.000 TEUs and an area of 20 ha. Many consultations were held with public and private terminals, in order to assess the average costs of implementing the measures. The sources requested anonymity.

The goal is to estimate a tariff per full unit for the purposes of cost recovery, in relation to import and export traffic only, and excluding empty containers, for movements within a vessel and for transshipments.

Basic parameters of the standard terminal

Maximum capacity of the terminal in TEUs	400.000
Maximum operational volume in TEUs	300.000
Total number of containers handled	200.000
Number of empty containers handled	50.000
Number of full containers handled	150.000
Number of transshipments and movements	50.000
Number of import and export containers	100.000
Number of export containers	55.000
Number of import containers	45.000
Expected growth rate for South America,	8.8%

2003-2012

MEASURES AFFECTING GOVERNMENTS

The first responsibility of governments under the new regulation is:

- To establish an appropriate national framework and designate the responsible agency;
- To assign security levels (1 = low; 2 = medium, 3 = high) to national flag vessels, to port facilities and to foreign vessels, and to pass on this information.

MEASURES AFFECTING PORTS

Port facilities which provide services to vessels involved in international trade will have to: (a) carry out and receive approval for a port facility security assessment (PFSA); (b) work out a port security plan, including details of the measures to be carried out for each level of security alert; (c) designate a port security official with the necessary skills and training; (c) ensure that the port security official and all associated personnel receive suitable training for their duties; (e) ensure that the port facilities are suitably equipped both in terms of personnel and facilities for the purpose of operating under three levels of alert.

Port facility security assessment, PFSA. The ISPS code establishes a minimum level of security measures which must be carried out at port facilities. The implementation costs cover a wide range, depending on the size and complexity of the port. According to the consultations held, they could be up to US\$ 100,000.

Taking the consultations and costs estimated by the Coast Guard of the United States as a reference, it has been estimated that the standard terminal considered here would require US\$ 10,000 for the initial expenditure and an annual amount of US\$2,000 for maintenance.

Port facility security plan (PFSP). The port facility security plan must be based on the result of the PFSA. The implementation costs also vary depending on the size and complexity of the port facility. The Coast Guard of the United States considers that the costs of conducting the PFSA are similar to those of the PFSP. There is a wide range of levels of security in South American ports, as some terminals have security standards comparable or superior to those of European or North American terminals, while others

are much less organized in this area. It is clear that the cost of preparing this plan will vary significantly in the different cases. The costs fluctuate between very low levels and one million dollars.

One important factor to consider is that a port which has several terminals must prepare a plan for each one. In the case of our standard terminal, the PFSP has an average initial cost of US\$ 20,000 and annual maintenance costs of US\$ 2,000.

Port security official, equipment, training and other matters. The terminals or ports must have a security official responsible for one or more port facilities. This component covers the costs related to wages and benefits for that security official and the investment and maintenance costs for the equipment needed.

The cost estimate for the security official must consider two factors. The first is that this person must be assigned exclusively to a port facility. The second is that the responsibilities of this official may be assigned to a pre-existing post, or a new one may be created. The creation of a new post has been considered here, with annual remuneration – plus benefits – of US\$20,000.

It is difficult to determine equipment costs as they vary significantly according to the prior condition of the terminal. According to the consultations held, the costs may be between US\$ 100,000 and US\$ 1,000,000. Various cases were considered, and the following level has been adopted: an investment in equipment of US\$ 600,000, consisting of US\$ 400,000 for elements such as perimeter fences, lighting, gate infrastructure, and so on, and about US\$ 200,000 for replaceables, such as communications equipment, TV cameras, sensors, and so on.

Maintenance and operating costs are estimated at 15%, or an annual US\$ 90,000, with the replaceable component to be updated every two years. Two vehicles for personnel transport vehicles would be required for movements within the terminal. The investment has been estimated at US\$ 40,000, with maintenance and operation of US\$ 8,000 and 5 drivers at an annual cost of US\$ 43,000.

VOLUNTARY MEASURES

The United States Government established two additional measures, CSI (Container Security Initiative) and C-TPAT (Custom-Trade Partnership Against Terrorism). CSI includes the 24-hour rule and transfers container inspection to the port of origin. C-TPAT requires the cooperative participation of all the members of the transport chain.

CSI. There are two modes of participation in this agreement that affect the direct costs: (a) adapting the terminal to the requirements of the initiative so that it can respond immediately, checking the origin and references of the loaders, and the preventive screening of certain loads, etc. Although this programme covers the customs services, port facilities come to have a very significant role in the programme, and the customs services should be able to establish a reliable and personalized electronic communications link; (b) in addition to the measures referred to, the installation of scanners.

24-hours rule. Of all the measures announced, this unilateral measure imposed by the United States on the containers destined for that country's ports is probably the one that has caused the most dissatisfaction. It obliges any vessel, transporter and/or forwarder to make a loading report 24 hours prior to loading of the container onto a vessel bound for the United States. This applies to any full container destined for the United States and any other containers loaded in the same ship, regardless of their final destination.

The application of this rule has already generated some costs, as some shippers on some routes apply a US Security Surcharge of US\$ 50 per container that has its origin or destination as the United States.

Although this mechanism has until now focused on the shippers, the apparent intention of the United States Government is to receive two reports, one from the shipper and one from the terminal.

In terms of quantifying the impact of this measure, the standard terminal would have to spend an estimated US\$ 20,000 to establish the communications system and the related procedures and would then spend US\$ 2 per container destined for the United States.

The standard terminal is defined as moving 55,000 export units, 15% of which would be transactions with the United States. If there is 100% compliance with reporting of these units, the 24-hour rule would involve an annual cost of US\$ 16,500, based on 8,240 export units at a unit cost of US\$ 2 each.

Scanners. In addition to the operating costs of scanning high risk containers, there are indirect costs relating to the number of movements of containers and the cost and time required to bring and remove the container from the scanner station. The costs are variable depending on the size of the port, labour costs and the technology of the container yard. The purchase price varies from US\$ 1,000,000 to US\$ 12,000,000 with a capacity of 4 to 12 containers per hour, depending on the technology used.

Opinions differ with regard to these prices, but for the purposes of the present paper, the basic investment is calculated as US\$ 6,000,000 for a high-performance unit, with annual maintenance and operation costs of 15%, or US\$ 900,000.

Although some manufacturers offer a working life of 10 to 15 years, it is expected that technological innovation will make the equipment obsolete within five years. The replacement cost, with reuse of some of the components of the original equipment, is estimated at a possible US\$ 4,000,000.

There is a significant additional cost: movement of the container for scanning, which involves using a chassis to transfer it to the inspection station and then to return it, estimated at US\$ 60, a cost which applies to containers exported to the United States.

For the purposes of cost calculations, the application of CSI is considered for the same standard terminal, without and with the scanner equipment.

Further costs are calculated below for assigning additional security personnel and checkers, which are shared by the ISPS requirements, for the inspection of vehicles and identification of persons at the gate.

An annual cost of US\$60,000 is estimated for paying 4 additional security guards (12 are needed for 24-hour coverage). It is also estimated that three additional checkers will be needed to cover one permanent post, at an additional cost of US\$ 30,000.

C-TPAT. The potential costs of this programme are not significant if there is compliance with the ISPS code and the CSI. On this basis, the resulting annual cost of C-TPAT is of the order of US\$ 10,000.

Miscellaneous costs. An additional annual cost of US\$ 30,000 has been estimated.

Indirect costs. An additional 12% is included in each case.

Taxes, import tariffs, VAT and others. The total of social benefits has been included and, with the exception of the scanner, average market prices have been considered that include local sales taxes.

In the case of the scanner, only the price fob has been considered, without tariffs, VAT, freight, etc. because such rates and values are applied very differently in different countries.

CALCULATION OF THE TARIFF FOR COST RECOVERY

The criteria for determining the tariff that allows cost recovery are as follows:

- A discount rate of 12%.
- The rate will be applied to full containers for export or import.
- It is first assumed that the volume handled does not vary over a ten-year period, and then the rate is reviewed to include annual growth of 8.8%.

The total cost in the first year includes the initial investments plus maintenance and operation, so that it is far higher than the total costs for subsequent years, which only include maintenance and operation, and in some cases replacement costs. In the present paper it is a question of determining a “flat tariff” which results in an updated cash flow projection equal to zero in ten years, that is, that the costs of implementing the new international measures are recovered within a ten-year period.

The flat tariff of the present exercise is an approximation to the recovery of the costs involved in the implementation of the security measures, based on the standard terminal considered. On this basis, it should not be interpreted as a suggested or indicative tariff, but as one referring to a terminal that has to make significant investments in equipment and in adaptation to the new security and safety rules.

First, the case of a standard terminal with a scanner is considered. It will be understood that the cost of both purchasing the scanner and replacing it have a significant impact on the total cost. In this case, the tariff to be applied is of the order of US\$ 36.30 per container. That is, if the terminal applies this tariff, the net present value of the payments made will be equal to zero after a ten-year period.

In the case of a terminal without a scanner, the total cost for the initial year is not as high as in the previous case. It is still, however, greater than in subsequent years, while higher levels of expenditure are recorded for the years in which the replaceable security equipment has to be updated. For this case, the tariff to be applied is US\$ 6.04 per container.

On the basis of these two tariffs, the approximate cost of implementing the measures in the South American area can be assessed. This will naturally depend on the percentage of terminals with or without a scanner in that area. In the present paper it is assumed that 50% of the movements of full containers in the Southern Cone are in terminals with scanners. Accordingly, the aggregate cost obtained for the subcontinent is US\$ 63,017,911^[1] for the first year, and US\$ 134,624,487 for the tenth year, owing to the increase in traffic.

As all the above tariff calculations were based on a discount rate of 12%, tariffs are presented below for different rates.

Tariff per container, in US\$, at different discount rates

Rate	Terminal with scanner	Terminal without scanner
8%	35,02	5,91
10%	35,66	5,98
12%	36,30	6,04

The model was used to calculate the theoretical tariff to be applied in each case, assuming an average regional growth rate of 8.8%. This estimate clearly does not consider the major investments needed to be able to absorb such volumes, and the fact that this hypothesis is very probably not viable for some terminals owing to space restrictions on growth.

Moreover, although various sources agree that this is a probable value for the growth rate, it will certainly not apply to all terminals, but only to those that can deal with an increasing number of

transshipments. As this factor is not included in the application of this tariff, it is applied to export and import volumes. Applying this growth index, the resulting tariff would be US\$ 23.98 and US\$ 4.39 respectively, for a terminal of 100,000 containers for export or import.

Calculation of tariffs for different sizes of ports

Maximum capacity, in TEUs	200.000	400.000	600.000	800.000	1.000.000
Maximum operating volume, in TEUs	150.000	300.000	450.000	600.000	750.000
Number of import and export containers, in TEUs	50.000	100.000	150.000	200.000	250.000

Calculation of tariffs, scenario without growth over the next 10 years

Tariff, with scanner, in US\$	63,16	32,59	22,40	17,30	14,24
Tariff, without scanner, in US\$	11,90	6,04	4,09	3,11	2,53

Calculation of tariffs, scenario with growth over the next 10 years (annual 8.8%)

Tariff, with scanner, in US\$	45,95	23,98	16,66	13,00	10,80
Tariff, without scanner, in US\$	8,90	4,39	2,99	2,29	1,87

Lastly, extending the model analysis to cover the case without growth, and varying the volume of load handled, the tariffs are calculated for five different options with maximum design capacity of from 200,000 to 1,000,000 TEUs (between 50,000 and 250,000 units for import and export), which covers the existing range of terminals in the region.

[1] This calculation is based on the volume of TEUs traded for the South American subcontinent in 2003, provided by the ECLAC Transport Unit.
