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# Property, plant and equipment: The case study of the railway sector in Portugal

## Activos fijos: El caso de estudio del sector ferroviario en Portugal

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**Abstract**
This paper intends to analyse the legal framework of the International Accounting Standard (IAS) 16 - Property, Plant and Equipment and its implantation in Portugal. The methodology presented is subdivided in a theoretical analysis, with a literature review, and in an empirical analysis, with a case study (Yin, 2018). The available data provided is based on the annual accounts of the railway sector. The results show that accounting information is substantially different from the globality of the other corporations.
**Key words:** property, plant and equipment; valuation; REFER; Portugal.

**Resumen**
La investigación analiza el marco normativo de la Norma Internacional de Contabilidad (NIC) 16 - Inmovilizado material y su implementación en Portugal. La metodología es subdividida en el análisis teórico, con una revisión de la literatura, y en el análisis empírico, con un estudio de caso (Yin, 2018). Los datos abiertos están basados en las cuentas anuales del sector del ferrocarril. Los resultados presentan información contable sustancialmente diferente de la globalidad de otras empresas.
**Palabras clave:** inmovilizado material; valoración; REFER; Portugal

## 1. Introduction

This paper examines the legal framework of the Property, Plant and Equipment (PPE) and their subsequent evaluation, defined herein on the IAS 16 standard (EC, 2020). The influence of the PPE on a firm's financial position represents the foundation in its economic and financial strategy. Firms with an ongoing focus of PPE may be willing to have these investments through long-term sustainability and value creation strategies.

As will be shown below, this paper contributes to the existing literature by examining the relationship between

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the international legal framework of the PPE and the Portuguese accounting practices. The methodology presented is subdivided in a theoretical analysis, with a literature review, and in an empirical analysis, with a Portuguese case study (Yin, 2018). Concerning the empirical research, the method presented is based on the content analysis (Ahrens and Chapman, 2006; Qu and Dumay, 2011) aiming to define "the essential characteristics of the object of study, the stages of development it has undergone and, very naturally, the more representative fields in which it has been proving, as well as the specific problems that in each of them raises" (Janeira, 1972: 370).

The objective of the case study is to explore the extent of PPE that is supplied by the annual accounts of the Portuguese firm *Rede Ferroviária Nacional* – REFER for the period between 2009 and 2014. REFER is a public business entity, endowed with administrative and financial autonomy and its own assets, whose main activity is the provision of public infrastructure management services that are part of the national railway network. This firm also is responsible by the construction, installation and renovation of railway infrastructure.

Furthermore, this section also studies the legislative framework of the PPE and the initial and subsequent measurement of them. The following section defines the research methodology and presents the REFER as the case study, as well as a special subject as the infrastructure management and the long-term infrastructure investment activity. The third section discusses the results of infrastructure management and of long-term infrastructure investment activity. The fourth section concludes.

## 1.1. Legislative framework of the Property, Plant and Equipment

The accounting information system has been undergoing significant changes, either due to the imposition of legal norms, or due to the influence of scientific investigations. Accounting standards have undergone enormous changes with the adoption, by the European Union, of the international financial reporting standards issued by the International Accounting Standards Board. The last publication took place on January 1, 2020 with the republishing of Regulation (EC) No. 1126/2008 (EC, 2020), being mandatory in all its elements and directly applicable to all Member States - as well as by changes resulting from the use of the rules provided for in the Accounting Standardization System (SNC, in Portuguese), approved by Decree-Law No. 158/2009, of July 13 (CNC,2020) and subsequently revised by Decree-Law No. 98 / 2015, of June 2 (CNC,2020). All this legislation is compiled at Rodrigues (2019).

In fact, Regulation (EC) No. 1606/2002 of the European Parliament and of the Council, of July 19 (EC, 2002: 3), stated in its article 1, that "has as its objective the adoption and use of international accounting standards in the Community with a view to harmonising the financial information presented by the companies referred to in Article 4 in order to ensure a high degree of transparency and comparability of financial statements and hence an efficient functioning of the Community capital market and of the Internal Market."

This Regulation further stated that "For each financial year starting on or after January 1, 2005, companies governed by the law of a Member State shall prepare their consolidated accounts in conformity with the international accounting standards adopted in accordance with the procedure laid down in Article 6(2) if, at their balance sheet date, their securities are admitted to trading on a regulated market of any Member State within the meaning of Article 1(13) of Council Directive 93/22/EEC of May 10, 1993 on investment services in the securities field" (EC, 2002: 3).

It added that the adopted IAS should be published in full in all the official languages of the Community, in the form of a Commission Regulation, in the Official Journal of the European Communities, which happened with the publication of Regulation (EC) No. 1725/2003, of September 21 (CE, 2003).

Subsequently, Commission Regulation (EC) No. 1126/2008, of November 3 (EC, 2008), replaced the previous Commission Regulation (EC) No. 1725/2003, of September 21 (EC, 2003), being the basis in Portugal of the Accounting and Financial Reporting Standards (NCRF, in Portuguese), approved by Notice no. 15655/2009, of September 7 (CNC,2020), and of the Accounting and Financial Reporting Standard for Small Entities (NCRF-PE, in Portuguese) of the SNC, approved by Notice no. 15654/2009, of September 7 (CNC, 2020).

As of January 1, 2010, with the enforcement of the SNC, NCRF 7 - PPE (CNC, 2020) is adopted for entities covered by article 3 and the NCRF-PE for the entities covered by article 9 of Decree-Law no. 158/2009 (CNC,2020). In 2011, with the publication of Decree-Law no. 36-A / 2011 (CNC, 2020), the Accounting Standardization Regime for Micro Entities (NCM) and Accounting Standardization Regimes for Non-Profit Sector Entities (NC-ESNL) were approved. These standards were most recently amended by Notice No. 8256/2015 (CNC, 2020), which approved the SNC NCRF, to be adopted in the financial years beginning in 2016.

The adoption of NCRF 7 and NCRF-PE (CNC, 2020) results the adoption of IAS 16 (CE, 2008). This is the standard that prescribes the procedures that an entity applies in the recognition (initial and subsequent) of PPE, aiming at the accounting treatment of them, particularly in the respective recognition and measurement.

## 1.2. Initial and subsequent measurement of PPE

The initial measurement of a Property, Plant and Equipment comprises: i) its purchase price, including import duties and non-refundable purchase taxes, after deducting discounts and rebates; ii*)* any costs directly attributable to placing the asset in the location and condition necessary for it to be able to function as intended; and iii*)* the initial estimate of the costs of dismantling and removing the item and restoring the location in which it is located, the obligation of which an entity incurs when the item is purchased or, as a consequence of having used the item during a certain period for different purposes, in accordance with [IAS 16.2] to [IAS 16.28] (EC, 2020: 126-131).

For the evaluation of a PPE, an entity has the option to choose between the cost model or the revaluation model. Rodrigues et al. (2015) warns of the implications of adopting each of these models, in particular as regards to (i) the measurement of the period's value (ii) the measurement of possible impairment losses and (iii) the determination of fair value at the date of the revaluation. And adds that it is necessary to discuss “the impact of each of these models on the financial information disclosed, in terms of present and future results; the value of equity capital and analysis of information by its users” (Rodrigues et al. (2015: 412)).

The theme of the so-called Revaluations, until December 31, 2009, was regulated by the norms that resulted from the Official Accounting Plan (MF, 1989), specific legal diplomas and the Accounting Guidelines, in particular Accounting Guidelines 16 - Revaluation of Property, Plant and Equipment.

The revaluation of Property, Plant and Equipment can also be carried out based on the fluctuation of the purchasing power of the currency. If this procedure were to be adopted, the excess amount was objective and verifiable. It is objective because it normally relies on price indices that reflect general price changes or, for tax reasons, on the monetary devaluation coefficients published annually by the Ministry of Finance. In addition, it is verifiable because when it is checked, the same amount is always obtained.

This revaluation can also be carried out based on fair value (Herrmann et al., 2006; Hitz, 2007). In this case, the evaluators proceed according to their own parameters; for this method, the amount reached is naturally subjective and hardly verifiable (in the sense that each evaluator reaches to a different amount due to the use of personal parameters) and only by pure coincidence would it coincide with that of the initial appraiser. During the term of the Official Accounting Plan (MF, 1989), many researchers questioned the usefulness and objectives of Free Revaluations, with Ferreira (1993: 171) reporting that “he always reacted against the so-called free revaluations. Someone has to point out cautions, show fears. In fact, indiscriminate practices of reassessments endanger the certainty of the Law and the bases of accounting information, and the resulting inconveniences are obviously alarming and significant. ”

Machado (1998: 724-725) also questions this re-measurement, stating that “there has been a tendency in companies in our country to favour the re-measurement of the value in use of Property, Plant and Equipment, with the complacency of the accountants, in order to present 'improved' balance sheet statements to financial institutions, investors and the general public. ”

The last legal reassessment occurred in Portugal was conducted following the publication of Decree-Law no. 31/98, of February 11 (MF, 1998). The accounting changes, in effect since January 2010, brought changes in the recognition and measurement of PPE. [IAS 16.2] (EC, 2020: 125) as well as NCRF 7.2 (CNC, 2020) provide the scope of accounting of PPE – unless specific cases where a Standard requires, or permits, a specific accounting treatment.

Many investigations have highlighted changes in accounting standards, as well as the importance that International Accounting Standards have had, in general, in accounting changes and, in particular, in the European Union. Among them, Alexander et al., 2014; Dun and Stewart, 2014; Fifield et al., 2011; Hoggett et al., 2015; Lapointe-Antunes and Moore, 2013; Sacho and Oberholster, 2008; Soderstrom and Sun, 2007).

The adoption of the PPE Revaluation Model requires changes and disclosures, specifically in the:

- Statement of financial position - Property, plant and equipment and revaluation surplus, as well as in the respective deferred tax liabilities,
- Income statement by nature - Depreciation and amortization expenses / reversals and Impairment of depreciable / amortizable assets (losses / reversals);
- Statement of changes in equity – Revaluation surplus of PPE, intangible assets and respective variations, in which the increases and decreases for the same year and the previous year are disclosed and justified;
- Annex - disclosures required in the notes relating to the PPE and Income Taxes.

Table 1 presents different studies conducted on the changes in the accounting standards sector, in general, and within the domain PPE, in particular.

In Marques et al. (2014a) and Marques et al. (2014b) it is exemplified the information disclosed by a listed entity and which adopts the revaluation model in the subsequent measurement of its PPE.

However, the recognition of a PPE is carried out for a revalued amount when its fair value can be reliably measured, according to [IAS 16.31] (EC, 2020: 131). In addition, revaluations must be made with sufficient regularity to ensure that the carrying amount does not differ materially from that which would be determined by using fair value at the date of the statement of financial position.

**Table 1**
PPE references studies and their impact in accounting standards

| Authors | Change in Accounting Standards / Issues addressed by PPE |
|---|---|
| Alexander *et al*. (2014)<br>Dun and Stewart (2014) | Framework and changes to international standards and respective accounting and financial reporting, both in individual accounts and in consolidated accounts. |
| Fifield *et al*. (2011) ; Hoggett *et al*. (2015);<br>Lapointe-Antunes and Moore (2013)<br>Sacho and Oberholster (2008)<br>Soderstrom and Sun (2007) | Importance and regulatory and accounting framework of international accounting standards and respective standardizing bodies. |
| Ferreira (1993)<br>Machado (1998)<br>Guimarães (2002) | Issues related to Fair value, when adopted in Portugal, both legal revaluations and free revaluations. |
| Ferreira (2010a); Ferreira (2010b)<br>Herrmann *et al.* (2006) ; Hervás Oliver (2005)<br>Marques (2013) | Framework and analysis of PPE, both international and national standards. |
| Ferreira (2010); Ferreira (2010b)<br>Herrmann *et al.* (2006); Hervás Oliver (2005)<br>Hitz (2007); Marques (2014) | Issues related to fair value, when adopting the cost model and the revaluation model in the subsequent measurement of PPE and respective specificities. |
| Marques *et al.* (2014a);<br>Marques *et al.* (2014b);<br>Marques *et al.* (2015) | Application of PPE to entities listed in Portugal, and comparison of this theme in Portuguese and Spanish accounting standards. |

Source: Own content

For Ferreira (2010b: 4) “conceptually, these elements give the accounted assets a value that is no longer the historical cost less accumulated depreciation (scope of the POC), but is closer to the market price (fair value), or the amount that the entity's managers believe should be attributed to the asset in the context of its continuity in the service of the company (value in use). This implies an evolution in the periodic adjustment of the value of assets by the cost allocation process, via depreciation, in the sense of their valuation, at each moment, to amounts not exceeding those that can be recovered through sale or continued use."

After the recognition and initial measurement, according to [IAS 16.15-28] (EC, 2020: 128-131), each class of PPE will be subsequently measured through the (i) Cost model, according to [IAS 16.30]; or the (ii) Revaluation model, according to [IAS 16.31-42], and that policy should apply to an entire class of PPE. Table 2 shows a schematic application of each of these models.

**Table 2**
Comparison between the cost model and the revaluation model

| Cost model | | | Revaluation model | | |
|---|---|---|---|---|---|
| Measurement After Recognition | = | Cost Asset | Measurement After Recognition (fair value at a revalued amount) | = | Fair Value at the date of the Revaluation |
| | | (-) | | | (-) |
| | | Accumulated Depreciation | | | Subsequent Sccumulated Depreciation |
| | | (-) | | | (-) |
| | | Accumulated Impairment Losses | | | Subsequent Accumulated Impairment Losses |

Source: Own content, based on EC, 2020

The value of the asset is the amount for which an asset is recognized after deducting any depreciation and accumulated impairment losses. The carrying amount of the revalued asset is the amount, after the revaluation adjustment, for which an asset is recognized after deducting subsequent accumulated depreciation and impairment losses.

The fair value of the PPE is determined through several criteria, according to [NCRF 7.32-33] (CNC, 2020): "Land and buildings: based on evidence obtained in the market and using the services of qualified and independent appraisers; and items of facilities and equipment: based on the market value determined by the valuation".

NCRF 7 (CNC, 2020) differs in this paragraph from the text of [IAS 16.32-33] (EC, 2020: 131-132) were deleted in the version in force in 2016. If an entity proceeds to revaluation of a PPE of a certain class, all assets of that class must be revalued, in accordance with [IAS 16.36] (EC, 2020: 132). Ferreira (2010a: 15) justifies this need based on the fact that "under pain of distorting the value of the class as a whole, thus affecting the principle that the SNC follows in relation to comparability and the true and appropriate image. In the same guideline, it appears that the revaluation of the assets of a class must be ensured simultaneously, that is, avoid the selective revaluation and the reporting of amounts that are a mixture between costs and values on different dates".

A PPE class is a grouping of assets of a similar nature and use in an entity's operations. [IAS 16.37] (EC, 2020: 132) indicates the different examples of separate classes: (a) land; (b) land and buildings; (c) machinery; (d) ships; (e) airplanes; (f) motor vehicles; (g) furniture and fixed supports; and (h) office equipment and (i) production plants.

Items included in an PPE class are, according to [IAS 16.38] (EC, 2020: 132), simultaneously revalued in order to avoid the selective revaluation of assets and the reporting of amounts in the financial statements that are a mixture of costs and amounts on different dates. However, an asset class can be revalued on a rotating basis as long as the revaluation of the asset class is completed in a short period and as long as the revaluations are kept up to date (Hervás Oliver, 2005).

In accordance with [IAS 16.34] (EC, 2020: 132), the frequency of revaluations of PPE must obey some regularity in order to ensure that the carrying amount does not differ materially from that which would be determined by the use of fair value to balance sheet date. This frequency depends on changes in the fair values of the PPE that are being revalued. When the fair value of a revalued asset differs materially from its carrying amount, a new revaluation is required, as per [IAS 16.34]. In this revaluation, the following procedures apply: "(i) Insignificant changes in their fair value: they may be revalued only every three or five years; and (ii) significant and volatile changes in its fair value: there will be a need for an annual revaluation".

On the revaluation date, the asset is treated in one of the following ways: "a) the "gross carrying amount" is adjusted in a manner consistent with the revaluation of the "asset's carrying amount". This method is often used when an asset is revalued by applying an index or coefficient to determine its depreciated replacement cost. "b) the accumulated depreciation is eliminated against the gross carrying amount of the asset". This method is often used when PPE are buildings, using their market value (EC, 2020: 132).

The amount of the adjustment arising from restatement or elimination of accumulated depreciation is part of the increase or decrease in the carrying amount, in accordance with [IAS 16.39-40] (EC, 2020: 132).

The recognition of the PPE Revaluation has to obey to the following procedures: (i) on the one hand, if the carrying amount of an asset is increased as a result of a revaluation, the increase must be recognized in other comprehensive income and accumulated in equity in an account with the title of revaluation surplus; however, the increase must be recognized in profit or loss to the extent that it reverses a revaluation decrease of the same asset previously recognized in profit or loss [IAS 16.39] (EC, 2020: 133)); (ii) on the other hand, if the carrying amount of an asset is decreased as a result of a revaluation, the decrease must be recognized in profit or loss.

[IAS 36.12-14] on Impairment of Assets (EC, 2020: 345-385) states that, in order to assess if an asset is impaired or not, external and internal sources of information should be used, discriminating against them.

However, the decrease must be recognized in other comprehensive income to the extent of any credit balance existing in the revaluation surplus with respect to that asset, in accordance with [IAS 16.40] (EC, 2020: 132). The decrease recognized in other comprehensive income reduces the amount accumulated in equity with the title of revaluation surplus.

The revaluation surplus included in equity in respect of an item of property, plant and equipment may be transferred directly to retained earnings when the asset is derecognised. This may involve transferring the whole of the surplus when the asset is retired or disposed of. However, some of the surplus may be transferred if the asset is used by another entity. In such a case, the amount of the surplus transferred would be the difference between depreciation based on the revalued carrying amount of the asset and depreciation based on the asset's original cost. Transfers from revaluation surplus to retained earnings are not made through profit or loss [IAS 16.41] (EC, 2020: 133).

The partial realization occurs when the PPE is used by an entity and the recognition is influenced by its annual depreciation. The amount of the surplus transferred will be the difference between the depreciation based on the revalued carrying amount of the asset and the depreciation based on the original cost of that asset.

[IAS 16.41] (EC, 2020: 133) also adds that transfers from the revaluation surplus to retained earnings are not made through profit or loss, but through the addition of Equity items. In Marques (2013) the analysis of a PPE is detailed; in Marques (2014) a practical example is presented that explains the revaluation model in detail and highlights the previously mentioned aspects; in Marques et al. (2015) a comparison of the accounting standards for PPE between Portugal and Spain.

In relation to Small Entities, it appears that the Revaluation of a PPE referred in NCRF-PE presents some differences in relation to what is prescribed in NCRF 7 (CNC, 2020). Thus the [NCRF-PE.6.1] (CNC, 2020) states that the accounting policy or policies to be applied to a given item will be the one(s) that follows from the chapter that specifically deals with the underlying transaction, another event or condition. Moreover, the [NCRF-PE.7.8] adds that an entity must apply the cost model of the [NCRF-PE.7.9] (CNC, 2020).

Only in cases where there are significant differences between the carrying amount according to the cost model and the fair value of the assets, an entity may, alternatively, use the revaluation model of the [NCRF-PE.7.10] (CNC, 2020) as its accounting policy and must apply that policy to an entire class of PPE. Rodrigues et al (2015: 433) considers that “access to the revaluation model at NCRF-PE is more restrictive compared to the general model.” Once that requirement is met, if a Small Entities adopts the NCRF-PE revaluation model, the accounting treatment of the transactions analysed in this case is similar in the context of a adopting for big entities, including with regard to deferred taxes (as per [NCRF-PE.7.10]. It is also important to point out that Small Entities requirements for disclosure of information are also lower than in the general model.

## 2. Methodology

### 2.1. Research methodology

As a research methodology it is proposed, for the theoretical background, a literature review, through bibliographic research of IAS 16 - PPE. Empirical research is a methodology based on the content analysis (Ahrens and Chapman, 2006; Qu and Dumay, 2011) since it allows “to know the essential characteristics of the object of study, the stages of development it has undergone and, quite naturally, the most representative fields in which it has been proving, as well as the specific problems that in each of them raises.” (Janeira, 1972: 370). Using as a basis the work developed by Yin (2018), the present research paper carries out a detailed and in-depth analysis of the National Railway Network - REFER, EPE.

REFER is a public business entity, endowed with administrative and financial autonomy and its own assets. Its main activity is the provision of public infrastructure management services that are part of the national rail network. It also has the responsibility of construction, installation and renovation of the railway infrastructure. REFER promotes and develops strategies to reinforce and create business opportunities in the railway sector, consolidating and stimulating the REFER Group's position in the national and international context of the sector. The empirical analysis is carried out between 2009 and 2014 because in 2015 REFER merged with Estradas de Portugal, SA. Infraestruturas de Portugal is the public company that results from the merger between Rede Ferroviária Nacional - REFER, EPE and EP - Estradas de Portugal, SA (EP, SA) through which REFER, EPE, incorporates, by merger, EP , SA, and is transformed into a public limited company, changing its name to Infraestruturas de Portugal, SA (IP, SA). This merger was carried out on June 1, 2015, following Decree-Law No. 91/2015, of May 29 (ME, 2015). To better understand the legislative framework that supports REFER's activity, Appendix 1 of the 2014 Management Report can be consulted (REFER, 2015).

The information was recovered, either by direct consultation of the information in the Information Disclosure System of the Issuing Entities of the Securities Market Commission (CMVM, 2020), or in the REFER website, on the *About Us - Information for Investors* section, from where the annual accountability documents were extracted (REFER, 2010; 2011; 2012; 2013; 2014; and 2015).

REFER's financial statements were prepared in accordance with the International Financial Reporting Standards (IFRS) as adopted by the European Union (EU), issued and in effect on December 31 of each year (since the economic year coincides with the year civil). Until 2009, these statements were ruled by the norms stated in the Official Accounting Plan (MF, 1989). Accordingly to Decree-law 158/2009, specifically no.1 of article 4 (CNC, 2020), companies with securities listed on regulated markets are required to prepare consolidated accounts according to international accounting standards (effective as from 2010). Under the terms of article 6 no. 1, this consolidation obligation applies to any parent company subject to the Portuguese law. As result, REFER must prepare consolidated accounts as from 2010. All amounts shown are expressed in thousand Euros (€k), without any rounding up or down, unless otherwise stated.

## 2.2. Case study: REFER

According to its annual financial statements (REFER, 2010; 2011; 2012; 2013; 2014; 2015), REFER is subject to the supervision of the Ministry of State and Finance and the Ministry of Economy, and was created in 1997 through Decree-Law no. 104/97, of April 29 (MEPAT, 1997) to ensure the management of the rail network as well as the assets that make up the Public Railway Domain (DPF, Portuguese), namely, the entire component of the railway infrastructure, built heritage and associated land. Its share capital has the legal form of “Statutory Capital”, entirely owned by the Portuguese State, and is therefore not expressed by shares or any other type of titles. As of December 31, 2014, its statutory capital was of €k1.486.000.

In the national context, REFER provides a public service for the management of the infrastructures included in the national railway network, with the right to charge fees due to the use of these infrastructures. REFER provides its users with the following services: (i) Essential services: comprise all the services necessary for the effective exercise of the right of access to the infrastructures; (ii) Additional services: provides, namely: electric power for traction under the terms provided in the applicable legislation; manoeuvres; rolling stock parking and special contracts for exceptional transport; (iii) Ancillary services: provides specific services, namely: provision of information of a commercial nature; provision of operational facilities at stations; the availability of spaces for the installation of equipment in the shared zones for the stations; supply of manpower for Operator's operational activities (supply of diesel and others); access to the telecommunications network; instruction in processes for authorization of circulation on the national railway network and performance of capacity or feasibility studies of supply scenarios; (iv) Merchandise Terminal Management: operational and commercial management of the set of fourteen terminals transferred from CP Carga; and (v) International Activity: development of new markets to enhance its knowledge and resources, obtaining new sources of revenue for the company.

The completion of operations is highly dependent on the maintenance of infrastructure assets, that is, the maintenance of the National Railway Network. For this purpose, maintenance actions are carried out in the specialties of track, catenary, signalling, telecommunications, low voltage, civil construction, just to identify the most significant in terms of workload. Thus, it is a perennial and essential work for the life cycle of the assets, developing in three separate levels: i) Systematic Preventive Maintenance; ii) Conditional Preventive Maintenance; and (iii) Corrective Maintenance. REFER’s activity is subdivided into two missions: the Infrastructure Management (GI) activity and the Long Term Infrastructure Investment (LDI) activity.

## 2.3. Infrastructure Management

Infrastructure Management (IM) corresponds to the provision of a public service, including functions such as the conservation and maintenance of infrastructures, capacity management, management of the regulation and security system, command and circulation control. Moreover, it encompasses the set of operating investments (for example, furniture and computers), with no implications for the concessions for the temporary use of LDI and railway operation.

The PPE recorded in REFER's statement of financial position, such as the equipment used by REFER, within the scope of the IM activity, are not allocated to the LDI activity. Its initial recognition is at the cost. After initial recognition, REFER adopted the cost model permitted by [IAS 16.29] and explained in [IAS 16.30] (EC, 2013: 125), and the evaluation of the PPE is carried at their cost less any accumulated depreciation and any losses accumulated impairment. Maintenance and repair expenses that do not increase the useful lives of these assets are recorded as expenses for the year in which they occur. Gains or losses on the disposal of assets are determined by the difference between the realization value and the book value of the asset, being recognized in the statement of comprehensive income.

Assets whose use arises from finance lease contracts are classified as PPE, in accordance with IAS 17 - Leases (EC, 2013: 135-148). Assets acquired under finance leases are depreciated in accordance with the policy established by the company for PPE of the same nature. Rents are made up of the financial charge and the financial amortization of the capital. The charges are allocated to the respective periods during the lease term in order to produce a constant periodic interest rate on the lessor's remaining net investment. Assets whose use arises from lease contracts for which the risks and benefits inherent to the possession of the leased asset are not assumed are classified as operating leases, in accordance with IAS 17 - Leases, and are therefore not recorded under the PPE item. Rentals are recorded as expenses in the respective periods during the lease term.

Depreciation is calculated on the acquisition values, using the straight-line method, at rates that correspond to the expected useful life for each type of asset. The useful lives of the assets are reviewed at the end of each year, so that the depreciations practiced are in accordance with the consumption patterns of the assets. The most relevant annual amortization rates are shown in Table 3.

**Table 3**
Depreciation rates of REFER's PPE

| Designation | % |
|---|---|
| Land | No depreciation |
| Buildings and other constructions | 2,00 |
| Basic equipment | 3,33 |
| Transport equipment | 25,00 |
| Tools and utensils | 12,50 |
| Office equipment | 12,50 |
| Other fixed assets | 12,50 |

Source: Adaptation from REFER (2010; 2011; 2012; 2013; 2014; 2015)

## 2.4. Long Term Infrastructure Investment Activity

Long-Term Infrastructure Investment Activities (LDI) includes the set of investments associated with new infrastructure and / or expansion of the Network; modernization and rehabilitation, with the introduction of new technologies, in the mode of operation; and substitutions, which include interventions that introduce lasting improvements or that are likely to increase the value and / or useful life of the asset without changing operating conditions. The financing required for the investments made is conducted by REFER and takes the form of obtaining credit from financial institutions and the capital market, suppliers, shareholder instalments (PIDDAC, loans and / or capital) and community subsidies.

As a result of the process of splitting the railway activity in Portugal, in 1997, REFER was in charge of the construction and renovation of the long-term railway infrastructures of the entire country. This is an activity developed in accordance with State directives, the financing of which is guaranteed through subsidies and loans mostly endorsed by the State, with REFER assuming the role of "agent" in this activity.

When there are DPF disaffections, the gain or loss obtained will be allocated to this activity. Thus, all flows resulting from this activity are disclosed in the statement of financial position, under the heading "Activity of Investments in Long-Term Infrastructure" and include the following items: (i) DPF's LDI constructed by REFER, but on which only the right of access for the provision of "Infrastructure management" services; (ii) Assets of the extinguished offices and assets transferred from CP, over which REFER only has the right of access, and cannot have rights over it; (iii) Materials purchased in connection with the construction / repair of LDIs, with the nature of stocks; (iv) LDI construction service providers, with balances payable; (v) Reimbursement from other entities in LDI, with balances receivable; (vi) Subsidies received for the co-financing of the construction of LDIs; (vii) Loans taken out to finance the construction and repair of LDIs, namely those guaranteed by the State; (viii) Financial charges directly incurred with the loans taken out to finance the construction and repair of LDI, which have not been capitalized as an acquisition cost of the LDI during its construction period; (ix) Product obtained from the profitability of diseased assets of the DPF; and (x) LDI in the public railway domain deactivated via slaughter / disposal.

These PPE-LDI are owned by DPF, and REFER only has access to them in order to provide "Infrastructure Management" services. As so, they are recorded in the statement of financial position under the heading LDI, as they do not qualify as assets controlled by this entity.

As previously stated, REFER is responsible for the construction and renewal of the long-term rail infrastructure, being an activity developed in accordance with State guidelines, whose financing is guaranteed through capital, state and European subsidies and loans mostly endorsed by the State, assuming REFER the role of "agent" in this activity. Applying this knowledge, the effects related to this activity are recognized and measured in accordance with IFRIC Interpretation 12 Service Concession Agreements (CU, 2014: 875-885) and SIC 29 Disclosure Service Concession Agreements (EC, 2013: 930 -932).

Thus, in order to apply IFRIC 12, the LDI Activity is considered to constitute the existence of a concession between the State (Public Entity) and REFER (equivalent to a Private Entity despite the fact that the only shareholder is the State), assuming that REFER has the role of "Concessionaire" in this activity.

IFRIC 12 - Service Concession Agreements (EC 2014: 875-885) was issued by the IASB in November 2006, to be used in the exercises conducted on or after January 1, 2008. Its adoption in the European Union occurred on March 25, 2009, and its application is mandatory for years beginning on or after January 1, 2010. IFRIC 12 applies to public service concession contracts in which the grantor (State) controls (regulates) the services to be provided by the concessionaire (using the infrastructure), to whom and at what price; and any residual interests in the infrastructure at the end of the contract. It applies to infrastructures built or purchased by the operator from third parties and already existing and to which the operator is given access.

Thus, and in view, REFER understands that the existing concession is included in the scope of this IFRIC as it is a for-profit entity and subject to the application of the Commercial Companies Code, despite its shareholder being the State. Its organisation is ruled by the regime foreseen in the legislation applicable to the public business sector (according to Decree-Law no. 133/2013, of October 3 (MF, 2013)) having equity independence from its shareholder, thus excluding the exclusion of application of [IFRIC 12.4] (EC, 2013: 875-885).

This Decree-Law (MF, 2013), that constitutes REFER, in substance, can be considered a concession agreement, since the State, as a Grantor, controls and regulates the public services provided by REFER, as a Concessionaire, with the infrastructures that are part of the national railway public domain, which defines who the services are provided to and at what price. In addition, the State, through ownership, controls the Infrastructures, as these belong to the public domain of the State, giving REFER the right of access to them to provide the public service by charging a tariff to passengers and goods.

This interpretation establishes the generic principles for the recognition and measurement of rights and obligations under concession contracts with the characteristics mentioned above and defines the following models: (i) Intangible asset model, when the operator receives the right to charge a concession fee tariff depending on the use of the infrastructure; (ii) Financial asset model, when the operator has an unconditional contractual right to receive money or another financial asset from the grantor, corresponding to specific or determinable amounts, the operator must register a financial asset (account receivable); in this model, the concessionaire entity has few or no discretionary powers to avoid payment, as the agreement is generally legally binding; and (iii) "Mixed" model, which applies [IFRIC 12.18] when the concession simultaneously includes remuneration commitments guaranteed by the grantor and remuneration commitments depending on the level of use of the concession's infrastructure.

In view of the typology of the models, it was considered that the one that best reflects the social object attributed to REFER is the Financial Asset model, since, according to the legislation in force, the State (public entity) will fully bear the costs associated with investments in national railway infrastructures, thus having REFER an unconditional right to receive money from the State for the investments made in LDI.

This right is conferred either by article 11 of the Basic Law of the Land Transport System for rail transport (LBTT), or by Decree-Law no. 141/2008, of July 22 (MOPTC, 2008), or even by the Strategic Transport Plan 2011-2015 and, revised in 2014, by the Strategic Transport and Infrastructure Plan (Horizon 2014-2020) (PETI3+). With regard to Financial Assets, resulting from the application of this standard, it was classified in accordance with IAS 32, IAS 39 and IFRS 7 (EC, 2013).

The initial registration of these assets was attached to the cost. Since the assets related to the LDI activity are not subject to depreciation, the amount by which they are carried does not change. Maintenance and repair expenses that do not increase the useful lives of these assets are recorded as expenses for the year in which they occur. Investment grants awarded to REFER are initially recognized when there is reasonable certainty that the grant will be received, and subsequently amortized in proportion to the depreciation of the subsidized PPE, in accordance with IAS 20 - State subsidies (EC, 2013: 204-224).

Operating subsidies are recognized in the income statement by nature in the same period in which the associated expenses are incurred, from the moment their receipt is probable. The subsidies obtained to finance the assets acquired / built in LDI are recognized in the statement of financial position in the item Grantor-State-Account Receivable because, since they are attributed within the scope of the concession activity, they constitute the reimbursement of a part of the expenses incurred and are therefore deducted to the amount receivable from the grantor.

In relation to capitalization of costs with loans, it appears that the interest on loans directly attributable to the acquisition or construction of eligible assets is capitalized as part of the cost of these assets. An asset eligible for capitalization is an asset that requires a substantial period of time to be available for use or for sale. Capitalization of borrowing costs begins when the investment begins and ends when all activities necessary to make the asset available for use or for sale are substantially completed.

REFER has in its warehouses materials to be applied in the construction of the PPE's in LDI. These inventories are presented in the statement of financial position under the heading “Activity of Investments in Long-Term Infrastructure”.

## 3. Results

### 3.1. Results of Infrastructure Management

The evolution of the Infrastructure Management activity, based on the annual financial statements (REFER, 2010; 2011; 2012; 2013; 2014; 2015), is expressed in Table 4, in the period from 2009 to 2014. The PPE recorded in the statement of financial position refers to the equipment used by REFER, within the scope of the IM activity. As stated before, all amounts are expressed in thousand Euros (€k).

As mentioned, REFER uses the straight-line method as a depreciation method, since the net value of PPE starts in 2009 with €k44.766 (€k82.365 gross and €k37.599 accumulated depreciation) and ends, in 2014, with €k33.454 (€k81.820 gross and €k48.365 accumulated depreciations).

For the mentioned period, the value of PPE acquisitions for the GI activity summed to €k7.335, the depreciations were calculated to be €k15.748 and, in the Write-offs/Adj. there was a net decrease of €k4.434.

In summary, with this case study, the accounting procedures of the PPE were successfully exposed and analysed, highlighting the cost model within the specifications of the railway sector in Portugal.

**Table 4**
PPE, 2009 to 2014 (thousand Euros)

| **Property, Plant and Equipment** | Opening balance 01-01-2009 | Transfers (2009 to 2014) | Increases (2009 a 2014) | Write-offs/Adj. (2009 a 2014) | Closing balance 31-12-2014 |
|---|---|---|---|---|---|
| Land and natural resources | 4.569 | 1.011 | 0 | -632 | 4.948 |
| Buildings and other constructions | 34.417 | 2.875 | 116 | -2.410 | 34.998 |
| Basic equipment | 21.512 | 1.379 | 2.387 | -1.152 | 24.126 |
| Transport equipment | 7.768 | 153 | 500 | -1.941 | 6.480 |
| Tools and utensils | 512 | -1 | 79 | 0 | 590 |
| Administrative equipment | 10.402 | 873 | 1.299 | -3.258 | 9.316 |
| Other tangible fixed assets | 457 | 0 | 1 | -21 | 437 |
| Work in progress | 2.728 | -4.756 | 2.953 | 0 | 925 |
| **Total gross Property, Plant and Equipment** | **82.365** | **1.534** | **7.335** | **-9.414** | **81.820** |
| **Depreciation - Property, Plant and Equipment** | Opening balance 01-01-2009 | Transfers (2009 to 2014) | Increases Depreciation (2009 a 2014) | Write-offs/Adj. (2009 a 2014) | Closing balance 31-12-2014 |
| Land and natural resources | | | | | |
| Buildings and other constructions | 8.078 | 0 | 5.657 | 375 | 14.110 |
| Basic equipment | 11.920 | -26 | 7.022 | -601 | 18.315 |
| Transport equipment | 7.223 | 26 | 728 | -1.807 | 6.170 |
| Tools and utensils | 501 | 0 | 73 | 2 | 576 |
| Administrative equipment | 9.500 | 0 | 2.243 | -2.933 | 8.810 |
| Other tangible fixed assets | 377 | 0 | 24 | -17 | 384 |
| Work in progress | | | | | |
| **Total depreciation** | **37.599** | **0** | **15.747** | **-4.981** | **48.365** |
| **Total Net Property, Plant and Equipment** | **44.766** | **1.534** | **-8.412** | **-4.433** | **33.455** |

Source: Adaptation of REFER (2010; 2011; 2012; 2013; 2014; 2015)

## 3.2. Results of Long-Term Infrastructure investment activity

The evolution of PPE, in the period from 2009 to 2014, and based on the annual financial statements (REFER, 2010; 2011; 2012; 2013; 2014; and 2015), confirms that the value of Infrastructure Investment Activity Long-term results from the investment in railway infrastructure, with its breakdown by asset and liability items being shown in Table 5. It is possible to conclude that between 2009 and 2014 the volume of investments made in LDIs increased by €k921.000 and the value of the respective financing decreased by €k24.000. It should be noted that, during this period, no information was provided for the items Inventories, Clients and Other accounts receivable and Loans obtained (short term).

**Table 5**
Long-Term Infrastructure, 2009 to 2014 (thousand Euros)

| Activity in long duration infrastructure investments (LDI) | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| **Assets** | **4.355.328** | **4.702.991** | **4.852.780** | **4.830.559** | **4.989.628** | **5.275.899** |
| Current | 4.355.328 | 4.702.991 | 4.852.780 | 4.830.559 | 4.989.628 | 5.275.899 |
| Grantor - State - Account Receivable | 4.327.448 | 4.672.416 | 4.828.334 | 4.807.873 | 4.970.380 | 5.254.047 |
| Inventories | 27.880 | 30.575 | 15.650 | 14.475 | 13.993 | 16.600 |
| Clients and other accounts receivable | | | 8.796 | 8.211 | 5.255 | 5.252 |
| **Liabilities** | **3.985.977** | **3.701.831** | **4.967.314** | **4.881.351** | **5.035.070** | **3.962.057** |
| Non current | 3.897.671 | 3.598.296 | 4.565.957 | 4.734.992 | 4.879.119 | 3.801.786 |
| Loans obtained | 3.897.671 | 3.598.296 | 4.565.957 | 4.734.992 | 4.879.119 | 3.801.786 |
| Current | 88.306 | 103.535 | 401.357 | 146.359 | 155.951 | 160.271 |
| Loans obtained | | | 262.377 | 72.881 | 91.261 | 91.261 |
| Suppliers and other accounts payable | 88.306 | 103.535 | 138.980 | 73.478 | 64.690 | 69.010 |
| **Activity in long term Infrastructure investments (Financial Position)** | **429.777** | **1.074.120** | **-114.534** | **-50.792** | **-45.442** | **1.313.842** |

Source: Adaptation from REFER (2010; 2011; 2012; 2013; 2014; 2015)

The detailed evolution of the financial asset underlying the concession is shown in Table 6. This overall variation of €k927 million derives from the items that make up the financial asset of the State account, which will be detailed in the following tables.

**Table 6**
Financial assets of the State account, 2009 to 2014 (thousand Euros)

| Grantor - State - Accounts Receivable | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| Assets under Concession (LDI) | 7.573.452 | 7.970.511 | 8.309.550 | 8.154.199 | 8.559.486 | 8.669.061 |
| Subsidies | -3.709.260 | -3.836.245 | -3.896.527 | -4.159.738 | -4.346.375 | -4.320.514 |
| Return on assets | -3.089 | -3.089 | -3.089 | -3.089 | -3.089 | -3.089 |
| Current Funds | -37.307 | -57.342 | | | | |
| Charged Interest | 503.652 | 598.581 | 723.600 | 908.701 | 1.065.558 | 1.213.789 |
| Impairments | | | -305.200 | -305.200 | -305.200 | -305.200 |
| **Total financial assets underlying the concession** | **4.327.448** | **4.672.416** | **4.828.334** | **4.594.873** | **4.970.380** | **5.254.047** |

Source: Adaptation of REFER (2010; 2011; 2012; 2013; 2014; 2015)

Table 7 shows the evolution of the Concession Assets (LDI), from 2009 to 2014. The increases recorded in the Assets under Concession – Active LDI result essentially from the transfer of ownership of CP's rail freight terminals. This increase can be justified by: Transfers to REFER that result of a government decision (usually through a joint order from the State Secretariats that oversee this public business entity); Transfer of assets within the scope of the conclusion of the RAVE integration process in REFER; Transfer of REFER TELECOM's fibre optic and videoconferencing infrastructure protocol to REFER.

**Table 7**
Concession Assets (LDI), 2009 to 2014 (thousand Euros)

| Gross assets | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| **Assets under Concession - Active LDI** | **7.573.501** | **7.970.653** | **8.310.766** | **8.156.921** | **8.559.013** | **8.669.141** |
| Land and natural resources | 221.570 | 223.927 | 224.092 | 23.640 | 237.231 | 237.070 |
| Buildings and other constructions | 4.685.657 | 4.912.273 | 5.793.859 | 6.050.744 | 6.231.503 | 6.231.592 |
| Basic equipment | 30.269 | 30.269 | 30.269 | 30.269 | 30.269 | 30.269 |
| Work in progress | 2.624.432 | 2.796.605 | 2.256.627 | 2.047.255 | 2.056.047 | 2.166.242 |
| Advances on account of ongoing assets - LDI's | 11.573 | 7.579 | 5.919 | 5.013 | 3.963 | 3.968 |
| **Assets under Concession - Discontinued LDI** | **-49** | **-142** | **-1.216** | **-2.722** | **473** | **-80** |
| Land and natural resources | -6.466 | -6.509 | -6.518 | -8.873 | -5.700 | -6.179 |
| Buildings and other constructions | 6.417 | 6.367 | 5.302 | 6.151 | 6.173 | 6.099 |
| **Total assets under concession - LDI** | **7.573.452** | **7.970.511** | **8.309.550** | **8.154.199** | **8.559.486** | **8.669.061** |

Source: Adaptation of REFER (2010; 2011; 2012; 2013; 2014; 2015)

The guidance of the Assets under Concession – Discontinued LDI presents the values of the DPF disaffection, which are deducted from the values of the Assets under Concession – Active LDI.

Table 8 shows subsidies allocated to REFER between 2009 and 2014.

**Table 8**
Grants received, 2009 to 2014 (thousand Euros)

| Subsidies | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|
| PIDDAC | 989.551 | 996.751 | 1.003.751 | 1.013.921 | 1.100.585 | 1.109.868 |
| Cohesion Fund | 1.094.959 | 1.164.474 | 1.217.142 | 1.469.861 | 1.554.464 | 1.519.679 |
| FEDER- IOT | 618.009 | 634.933 | 635.547 | 635.869 | 635.869 | 635.869 |
| DGTREN / RTE-T | 31.334 | 64.680 | 64.680 | 64.680 | 80.050 | 79.691 |
| Other | 975.407 | 975.407 | 975.407 | 975.407 | 975.407 | 975.407 |
| **Subsidies - Invest.** | **3.709.260** | **3.836.245** | **3.896.527** | **4.159.738** | **4.346.375** | **4.320.514** |

Source: Adaptation of REFER (2010; 2011; 2012; 2013; 2014; 2015)

In the period from 2009 to 2014, it appears that the amounts of these subsidies result from the LDI, with the increases being mainly derived from the Cohesion Fund in the amount of €k425.000 and the PIDDAC in the amount of €k120.000. The item Monetization of Assets reflects the result of the profitability of DPF assets, and the amount shown in Table 6 (€k3.089) corresponds to the total remuneration of the contract. The debited interest item corresponds to the amounts charged to the grantor (from 2009 to 2014 the total sum is €k5.013.879), the corresponding consideration being reflected in the item Financial gains - interest earned - grantor - State.

Regarding Impairments, when REFER was incorporated, the statutory capital was paid with the delivery of the railway infrastructure, which was then valued at €k62.350. From 1998-2001, the Portuguese State increased REFER's statutory capital by a total of €k242.850. With the adoption of IFRIC 12 (EC, 2013: 875-885), these values take the form of reimbursement made for investments made in long-term infrastructure by the REFER concessionaire. This amount will no be reimbursed by the State/grantor, with €k305.200 being impaired.

## 4. Conclusions

This paper has described the accounting treatment for PPE in terms of IAS 16 noting that the definition and the recognition criteria of PPE are consistent with the definition and recognition of an asset found in the conceptual framework for financial reporting. From this IAS study, the alternative two accounting models under which PPE evaluation is carried were presented, specifically: the cost model, whereby the PPE is measured at cost less accumulated depreciation and any accumulated impairment losses; and the revaluation model, whereby the PPE is measured at revalued amount less subsequent accumulated depreciation and any subsequent accumulated impairment losses. In this last model, accumulated depreciation recorded to the date of revaluation is either restated proportionally with the change in the gross carrying amount of the asset (the gross replacement method), or eliminated against the gross carrying amount of the asset. The resultant net carrying amount is then restated (the net replacement method).

This paper also confirms that in Portugal the changes conducted in 2010 in the accounting standards through Decree-law Nº 158/2009, of July 13 (CNC, 2020), covered the way for the subsequent to initial recognition of PPE, giving the companies the option to choose between the cost model and the revaluation model. Both models provide an assessment of the PPE so that the users of the financial statements can identify key points about the entity’s own investment in its property, plant and equipment and the changes in such investment.

Furtermore, the empirical analysis conducted, based on the annual accounts of the Portuguese firm REFER on the period between 2009 and 2014, shows that: first, the PPE is not qualify as assets controlled by the firm because, according the IFRIC 12, they are registered in the scope of Service Concession Agreements; second, PPE are initially measured at its cost; third, since these assets type are not subject to depreciation, the amount by which they are carried does not change; and four, repair and maintenance expenditures that do not increase the useful lives of these assets are considered as expenses for the year.

As a promising area for future research, another case study should be analysed to consider if the conclusions of this research concerning the Portuguese railway sector can be generalized to other national and/or international sectors of activity. In addition, taking into account that the influence of PPE on firm's financial position represents a key role in its economic and financial strategy, it would also be useful to examine if all firms with an ongoing focus of PPE are willing to have investments through long-term sustainability and value creation strategies.

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