Portuguese method for building condition assessment

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Abstract

Purpose – The purpose of this paper is to discuss a method for assessing the condition of buildings. The method was developed in Portugal as part of a new Urban Tenancy Regime approved in 2006.

Design/methodology/approach – The method was developed in six phases, namely: definition of objectives; analysis of existing instruments; formulation of the proposal; discussions with organisations in the rented sector; pilot; and technical presentations of the final version.

Findings – The method is viable and adequate, since a balance was achieved between the accuracy of the results in view of their importance for the contractual relationship between landlord and tenant, and feasibility in terms of human and financial resources available for its implementation.

Research limitations/implications – The method has been in use for two years. Further research is needed to confirm the accuracy of the results.

Practical implications – The results are used to determine the maximum annual rent value and to summon landlords to carry out repairs if the state of the building falls short of the required standard of maintenance. In a broader perspective the method is also used to assess of rented stock condition of large property owners and, in an adapted form, to assess buildings viability and determine repair needs.

Originality/value – This paper is relevant because it describes the assessment method; the previous methods for assessing the condition of Portuguese buildings were too simplistic and lacked the accuracy, transparency and independence required.

Keywords Buildings, Quality assessment, Building conservation, Urban areas, Tenancy, Portugal

Paper type Research paper

1. Introduction

A building survey consists of an investigation and assessment of the construction and condition of a building, which generally include the structure, fabric, finishes and grounds (CIC, 1996). A thorough assessment of a building condition is a technically complex task, requiring knowledge, time and equipment. In several countries the condition of a building is assessed on the basis of a diagnosis of the extent of deterioration in the building elements. Some assessment methods are statutorily prescribed, such as *Grille d'évaluation de l'état des immeubles susceptibles d'être déclarés insalubres* (Ministre de la Santé, de la Famille et des Personnes Handicapées, Ministre de l'Équipement, des Transports, du Logement, du Tourisme et de la Mer, 2003), *The Housing Health and Safety Rating System – HHSRS* (Office of Public Sector Information, 2005), and *The Standard Condition Assessment of Building and*

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Installation Components (NEN, 2006, 2007). Apart from some differences in the objectives, the assessment methods and development processes in the various countries are very similar.

The condition of a building is assessed by systematic registration of the entire building, divided into elements. Despite variations in the classification of these elements, the aim is to provide a comprehensive assessment. Any defects detected in an element are assessed on a scale based on pre-defined criteria. The assessment is carried out by means of visual inspections performed by qualified surveyors. The level of defect in the different elements is registered in a checklist and then aggregated with a formula to generate a numerical score. To promote consistency in the scores and to provide a training resource, the application of the criteria is explained by instructions usually illustrated with photographs of common defects.

The methods are developed to ensure that the assessment is not affected by the type or age of the building. They do not suggest corrective actions for defects as, before this can happen, the causes of the defect need to be identified by further investigation. Although the results may be used for the planning and prioritisation of maintenance, this is not the primary intention.

The methods are developed by research teams and based largely on existing methods. Expert advice is sought during the development process, which also involves pilots to test both the model and the tools. The practical application is monitored and the experience can be used to identify potential improvements.

In Portugal, the method for assessing the condition of buildings was developed as part of a new Urban Tenancy Regime. This paper presents the Portuguese method, which strongly resembles the methods described above. The Portuguese experience will prove useful for other researchers in the same field. Below, Section 2 describes the situation of the Portuguese rented stock. Section 3 explains the research methodology and Section 4 addresses the assessment model and application tools. The results are discussed in Section 5.

2. The Portuguese rented housing stock

The last census (2001) estimates that the Portuguese housing stock consists of 5.02 million dwellings. This stock is reasonably recent, since more than 75 per cent of these dwellings were younger than 40 years, and 45 per cent younger than 20 years. In 2001, there were 1.37 dwellings per household; hence, only 71 per cent of the dwellings were used as a permanent residence; the rest were used seasonally (18 per cent) or were unoccupied (11 per cent). Of the dwellings, 75 per cent used as a permanent residence were owner-occupied, 21 per cent were rented in the private sector and 4 per cent in the social housing sector.

The percentage of rented housing stock has declined in recent years, particularly in the private sector: 38.9 per cent in 1981, 30.6 per cent in 1991 and 21.0 per cent in 2001. This decline corresponds with an absolute decrease in the number of private rented dwellings: 142,000 less between 1981 and 1991, and 191,000 less between 1991 and 2001. Meantime, there was an increase in the percentage of owner-occupied housing. Two main reasons underlie this shift in tenure composition. Before 1990 there were several periods in which rents were frozen or rent increases were restricted, due to periods of social or economic instability, and as a result private investors became less

interested in rented housing. After 1990, new contracts were left to the free market, but low interest rates stimulated home ownership.

In 2001 there were approximately 740,000 tenancy agreements, 420,000 of which were signed before 1990. Rents in the pre-1990 agreements were, on average, only 55 euros per month, compared with 220 euros in post-1990 agreements. The low rents in pre-1990 agreements led to situations of social injustice, in which tenants paid rents that were below the fair market value and thus had no desire to move. It also led to decades of neglect and under-funded maintenance on the part of the landlords. The progressive deterioration of buildings impaired the urban image of Portuguese cities and undermined the habitability of many rented units. According to the census of 2001, 44 per cent of rented dwellings were not in need of repair, 30 per cent needed minor repairs, 22 per cent needed moderate or major repairs, and 4 per cent were in a very bad condition. Rented dwellings were in a far worse condition than owner-occupied dwellings.

In 2006, the government approved a new Urban Tenancy Regime in a bid to change this situation (*Diário da Republica*, 2006a). The main objectives of the regime were to promote the rented market in such a way that it offered an economic alternative to home ownership, facilitated residential mobility, promoted urban rehabilitation and restored confidence in private investment in real estate. The new regime introduced a crucial change by allowing an extraordinary update of rents for tenancy agreements signed before 1990.

To regulate the rent increase the new regime compiled a formula to compute the maximum annual value, namely: 4 per cent of the tributary patrimonial value of the rented unit multiplied by a maintenance coefficient. The tributary patrimonial value was already used to determine a tax on property and reflected the market value of the rented unit. It is set by the General Directorate of Taxes, which uses a statutory assessment method (*Diário da Republica*, 2003) comprising the following parameters: average construction cost per square metre, area, use, location, quality and age. The quality criterion covers the condition of the property, but counts for very little in the overall assessment.

The maintenance coefficient is linked to the condition of the building as follows: excellent – 1.2, good – 1.0, medium – 0.9, bad – 0.7, very bad – 0.5. After the assessment, the maintenance coefficient can be increased on the basis of maintenance by the tenant or decreased on the basis of illicit acts or lack of maintenance by the tenant.

Once the updated value has been established, the rent is gradually increased over a period of two to ten years depending on the tenant's income and age. Tenants with a low income may apply for rent subsidies. To encourage rehabilitation, this extraordinary rent increase is not allowed for buildings in a bad or very bad condition. Any tenant in this situation can demand that the landlord carry out the necessary repair. If the landlord fails to respond, the tenant may take the initiative and carry out the repair him/herself; ask the municipality to impose coercive repair on the landlord; or buy the unit for its tributary patrimonial value with an obligation to carry out the repair. Repair by the tenant are offset in the rent.

The Secretary of State for Internal Administration, who was responsible for the development of the new regime, asked the National Laboratory for Civil Engineering

(LNEC) to develop a method to assess the condition of buildings. So, the main research question was how to assess the condition of rented units within the legal parameters.

3. Research methodology

3.1. Phase 1: definition of objectives

It was decided that the assessment method should:

- determine the condition of the buildings and the presence of basic infrastructure on a five-point scale;
- deliver results that correctly convey the level of maintenance and are as independent as possible of the evaluator;
- apply to all buildings regardless of use, construction date, construction process, location, costs, size, etc.;
- be accepted by different parties in the rented sector;
- be applied by architects or civil engineers who receive a short training course;
- ensure that the final result and the way in which it was obtained could be easily understood; and
- remain within the limits of reasonable investment.

3.2. Phase 2: research and development

Existing Portuguese methods for assessing the condition of buildings were analysed. Two simple assessment tools, one used in legal provisions (*Diário da Republica*, 2000) and the other for supporting data of the 2001 housing census, were not accurate enough and failed to meet the objectives. Third, despite giving useful information, the model used in the methodology developed by LNEC to certify minimum habitability under an earlier review proposal for the Urban Tenancy Regime (Pedro *et al.*, 2006) proved unsuitable.

A proposal for a new assessment method was developed which took experience from other countries on board. In this model the assessment of a building is split into functional elements. The defect is then assessed for each element. General criteria were defined and experts helped to organise tables of frequent defects and to establish weighting coefficients for the functional elements. Later, these defects were illustrated with photographs.

3.3. Phase 3: discussion and pilot

During the development phase the proposal was discussed with the ministerial staff and opinions were sought from professional associations of engineers and architects. The assessment method was then presented to 15 organisations in the rented sector, which were asked to study it and suggest improvements. Some organisations expressed their opinions at meetings and others sent written appraisals.

After this discussion, a pilot was organised to test and validate the method.

3.4. Phase 4: improvement, approval and presentations

The opinions, the written appraisals and the knowledge gained from the pilot led to improvements and to the final version of the method, which was approved by Ministerial Decree 1192-B/2006 of 3 November (*Diário da Republica*, 2006b). Five

seminars attended by more than 1,500 participants were organised in the main Portuguese cities to apprise engineers and architects of their role in the system.

4. The assessment method

4.1. Checklist

The condition of a rented unit is assessed by means of a visual inspection. A checklist was compiled for registering the information (Figures 1 and 2). It was divided into eight sections: identification, characterisation, defects in functional elements, defect index, description of severe and critical defects, evaluation, observations, evaluator's details, and maintenance coefficient.

The identification section includes the address and other administrative information on the unit. The characterisation section collects data on morphological aspects that do not influence the result, but are useful when recording the main characteristics of the building and for statistical analysis.

The section on defects in functional elements evaluates the severity of defects in each of the 37 functional elements in the building. Each functional element consists of a set of sub-elements with a specific function (e.g. structure covers foundations, columns, supporting walls, beams, floors and structural parts of balconies). These functional elements are organised into three groups: the building as a whole, the shared parts, and the unit. The second group (shared parts) is used only for buildings with more than one unit (e.g. apartment blocks).

The level of a defect in any given functional element is assessed on a five-point scale: minor defect (five points), slight defect (four points), medium defect (three points), severe defect (two points) and critical defect (one point). A weighting coefficient, varying between one and six points, is linked to each functional element. The score of the functional element is derived from the product of the number of points linked to the defect level by the weighting coefficient. If the functional element does not figure in the rented unit, the answer is "not applicable" and no score is calculated.

The defect index calculates the total of the scores for the applicable functional elements, the sum of their weighting coefficients and the quotient of the two totals.

The description of severe and critical defects explains the reasons behind the score for each functional element. This description is accompanied by photographs to illustrate the situation found by the evaluator. The photographs can also be used to supervise the evaluator's work.

The evaluation section presents the condition of the building and is obtained by applying the calculation formula to the defect index. Situations that constitute a serious danger to public or private health or safety and require immediate intervention from the authorities are also highlighted (reasons described in the next section).

The observations section registers particularities, such as functional elements assessed by indirect signs because a direct inspection was not possible, functional elements that were not assessed because access was not authorised, and claims of maintenance and repairs and/or illicit acts by the landlord or tenant.

The evaluator section records the evaluator's name and the inspection date.

The maintenance coefficient section is filled in by a municipal committee. The condition determined by the evaluator is converted into a maintenance coefficient that

NRAU – NEW URBAN TENANCY REGIME
Checklist to assess the condition of buildings
(Ministerial Decree n. 1192-B 2006, 3rd of November)

Evaluator code ____ Checklist number ____

A. IDENTIFICATION

Street: .....

Number: ..... Floor: ..... Local: ..... Zip Code: .....

District: ..... Municipality: ..... Civil Parish: .....

Matricial Article: ..... Fraction : ..... GIS Code (facultative): .....

B. CHARACTERIZATION

No. of floors of the building	No. of units of the building	Construction period	Structural typology	No. of rooms of the unit	Use of the unit
__|__|	__|__|	_____	_____	__|__|	_____

C. DEFECTS IN FUNCTIONAL ELEMENTS

	Defects					Not applicable	Weight	Score
	Minor	Slight	Medium	Severe	Critical			
Building	(5)	(4)	(3)	(2)	(1)			
1. Structure	☐	☐	☐	☐	☐		x 6 =	_____
2. Roof	☐	☐	☐	☐	☐		x 5 =	_____
3. Protruding elements	☐	☐	☐	☐	☐	☐	x 3 =	_____
Other shared parts of the building								
4. Walls	☐	☐	☐	☐	☐	☐	x 3 =	_____
5. Floor coverings	☐	☐	☐	☐	☐	☐	x 2 =	_____
6. Ceilings	☐	☐	☐	☐	☐	☐	x 2 =	_____
7. Stairs	☐	☐	☐	☐	☐	☐	x 3 =	_____
8. Windows and doors	☐	☐	☐	☐	☐	☐	x 2 =	_____
9. Guarding against falls from upper storeys	☐	☐	☐	☐	☐	☐	x 3 =	_____
10. Water services	☐	☐	☐	☐	☐	☐	x 1 =	_____
11. Sewage services	☐	☐	☐	☐	☐	☐	x 1 =	_____
12. Gas services	☐	☐	☐	☐	☐	☐	x 1 =	_____
13. Electricity and lighting services	☐	☐	☐	☐	☐	☐	x 1 =	_____
14. Communications and alarm services	☐	☐	☐	☐	☐	☐	x 1 =	_____
15. Lifts	☐	☐	☐	☐	☐	☐	x 3 =	_____
16. Fire safety services	☐	☐	☐	☐	☐	☐	x 1 =	_____
17. Trash chute services	☐	☐	☐	☐	☐	☐	x 1 =	_____
Unit								
18. External walls	☐	☐	☐	☐	☐		x 5 =	_____
19. Internal walls and partitions	☐	☐	☐	☐	☐	☐	x 3 =	_____
20. External floor coverings	☐	☐	☐	☐	☐	☐	x 2 =	_____
21. Internal floor coverings	☐	☐	☐	☐	☐	☐	x 4 =	_____
22. Ceilings	☐	☐	☐	☐	☐	☐	x 4 =	_____
23. Stairs	☐	☐	☐	☐	☐	☐	x 4 =	_____
24. External windows and doors	☐	☐	☐	☐	☐		x 5 =	_____
25. Internal windows and doors	☐	☐	☐	☐	☐	☐	x 3 =	_____
26. Protection and shading devices of windows	☐	☐	☐	☐	☐	☐	x 2 =	_____
27. Guarding against falls from upper storeys	☐	☐	☐	☐	☐	☐	x 4 =	_____
28. Sanitary equipment	☐	☐	☐	☐	☐	☐	x 3 =	_____
29. Kitchen equipment	☐	☐	☐	☐	☐	☐	x 3 =	_____
30. Water services	☐	☐	☐	☐	☐	☐	x 3 =	_____
31. Sewage services	☐	☐	☐	☐	☐	☐	x 3 =	_____
32. Gas services	☐	☐	☐	☐	☐	☐	x 3 =	_____
33. Electricity services	☐	☐	☐	☐	☐	☐	x 3 =	_____
34. Communications and alarm services	☐	☐	☐	☐	☐	☐	x 1 =	_____
35. Ventilation services	☐	☐	☐	☐	☐	☐	x 2 =	_____
36. Heating/cooling services	☐	☐	☐	☐	☐	☐	x 2 =	_____
37. Fire safety services	☐	☐	☐	☐	☐	☐	x 2 =	_____

D. DEFECT INDEX

Total of scores	(a)	
Total of weights of applicable functional elements	(b)	
Defects index	(a/b)	

Figure 1.
Checklist (front)

E. DESCRIPTION OF SEVERE AND CRITICAL DEFECTS

Functional element number	Synthesis report of the defect	Illustrative photographs
_____	.....	_____
_____	.....	_____
_____	.....	_____
_____	.....	_____
_____	.....	_____

F. EVALUATION

Based on the observation of the present and visible conditions at the moment of the inspection and as established in article 6 of Ministerial Decree no. 1192-B/2006, of 3 November, I declare that:

- The maintenance condition of the unit is:
  Excellent ☐ Good ☐ Medium ☐ Bad ☐ Very bad ☐
- The maintenance condition of functional elements 1 to 17 is _____
  (to be filled in only when an appraisal of the building as a whole is requested)
- There are situations that constitute a serious risk for the residents or the public safety or health: Yes ☐ No ☐

G. OBSERVATIONS

.....

.....

.....

.....

.....

H. EVALUATOR

Evaluator's name: ..... Inspection date: _____|_____|_____

I. MAINTENANCE COEFFICIENT (filled in by MAC)

As established in letter c) of no. 1 of article 49 of Law no. 6/2006, of 27 February, and in article 15 of Decree-Law n. 161/2006, of 8 August, the above-mentioned unit has been accorded the following maintenance coefficient: ____,____

Issuing date: _____|_____|_____ (Valid for: 3 years)

(This checklist should be filled in according to the instructions available at *www.portaldahabitacao.pt/nrau*)

Figure 2.
Checklist (reverse)

takes account of possible maintenance and repairs carried out by landlords and tenants.

4.2. Assessment criteria

The level of a defect is assessed by comparing the current performance with the original performance. This does not take account of the original level of quality or safety, adherence to building regulations or the presence of illegal constructions.

Four criteria are applied:

(1) the effects of defects on the functional requirements;

(2) the type and extent of the required repairs;

(3) the relevance of the affected space or facilities to the unit's use; and

(4) the existence of alternatives to the affected space or facilities.

The first two criteria, relate to the severity of the defect, are applied in accordance with the rules in Table I.

Simple repairs usually amount to cleaning, painting and other superficial interventions. Complex repairs require more than superficial interventions. Minor accidents refer to minor injuries or damaged goods and major accidents refer to severe or life-threatening injuries.

The third and fourth criteria, relate to the location of the defect, are applied in accordance with the following rules:

- *Relevance of the affected space*. The level of a more serious defect that affects the main parts of a unit takes precedence; if the more serious defect affects secondary parts, the average of the level for the main and the secondary parts is worked out, with less importance accorded to the secondary parts; defects in shared parts are evaluated only if they affect the use of the unit.

Slight defects	Medium defects	Severe defects	Critical defects
Defects prejudicial to aesthetics, requiring simple repairs	Defects prejudicial to aesthetics, requiring complex repairs		
	Defects prejudicial to use or comfort, requiring simple repairs	Defects prejudicial to use or comfort, requiring complex repairs	
		Defects that endanger health or safety and may cause minor accidents, requiring simple repairs	Defects that endanger health or safety and may cause minor accidents, requiring complex repairs
			Defects that endanger health or safety and may cause major accidents

Table I.
Rules for assessing the severity of defects

- *Existence of an alternative with a use equivalent to the affected space or facility*. The average of the levels of the defect is worked out (e.g. the existence of two lifts, one operational and the other non-operational).

The main parts of a unit are the spaces where key functions take place (e.g. bedrooms, kitchen, living room, bathrooms, pantry, hall); the secondary parts are spaces with supplementary functions (e.g. verandas, basement, attic, garage).

The evaluator integrates these four criteria for each functional element.

4.3. Weighting coefficients

The importance of each functional element in the assessment of the state of the unit is expressed in a weighting coefficient varying from 1 (minor importance) to 6 (major importance).

These coefficients were determined after information was obtained from experts who participated in the pilot. In buildings with more than one unit, the functional elements of the shared parts weighed 39 per cent and those of the unit 61 per cent.

4.4. Calculation formula

Three rules were formulated to convert the defect index into a rating that reflects the condition of the unit. The first rule classifies the defect index on a scale of five levels, according to the intervals shown in Table II.

The second and third rules are designed to correct, if necessary, the result of the first rule in order to avoid extreme individual values below the average value; hence, they establish conditions for the maximum distance between each defect value of a functional element and the average value.

The second rule states that no functional element with a weighting coefficient of three or more shall have a condition – determined by matching the level of defect on the scale used in the first rule – that is more than one point below the state of repair of the rented unit. If this condition is not met, the state of repair of the rented unit is downgraded to the level immediately above the condition of the worst functional element with a weighting coefficient of three or more.

The third rule states that no functional element with a weighting coefficient of one or two shall have a condition, determined as above, that is more than two points below the condition of the rented unit. If this condition is not met, the state of repair of the rented unit is downgraded to the level that is two points above the condition of the worst functional element with a weighting coefficient of one or two.

The following situations exemplify the application of these rules:

- If the defect index is 3.75, according to the first rule, the condition is "Good". But if the functional element "Structure", which has a weighting coefficient of 6, has

Table II.
Scale to classify the defect index

Defect index (Di)	$5.00 \geq$ Di ≥ 4.50	$4.50 >$ Di ≥ 3.50	$3.50 >$ Di ≥ 2.50	$2.50 >$ Di ≥ 1.50	$1.50 >$ Di ≥ 1.00
Condition	Excellent	Good	Medium	Bad	Very bad

"Severe defects" (level 2), the condition is downgraded to "Medium" (defect level 3).

- If the defect index is 4.60, according to the first rule, the condition is "Excellent". But if the functional element "Communications and alarm services", which has a weighting coefficient of 1, has "Severe defects" (defect level 2), the condition is downgraded to "Good" (defect level 4).

4.5. Instructions

The aim of the instructions is to ensure that the different evaluators apply the assessment method correctly and thus attain consistency in the results. This document includes the evaluator's code of ethics and liability; a description of how evaluators, tenants and landlords should proceed during an assessment; an explanation of how to fill in each section of the checklist; a description of the assessment criteria; an extensive (but not exhaustive) list of frequent defects for each constructive element classified according to level; the calculation formula and examples of application. Common defects are illustrated by more than 400 photographs (Figure 3).

Instructions are not included in the Ministerial Decree. Improved versions based on experience collected during the implementation are made available on the internet.

4.6. Application procedure

The Institute for Housing and Urban Rehabilitation (IHRU) is responsible for managing the assessment method at national level. In each municipality there is a Municipal Arbitrational Committee (MAC) made up of representatives of the main stakeholders in the rented sector: the municipality, landlords, tenants, engineers, architects and lawyers. These committees implement the assessment method at municipal level and have administrative, monitoring and decision-making competences.

The evaluators who apply the assessment method are architects or civil engineers from professional associations who have followed a training course specifically for this purpose. As an exception during the first two years, professionals with at least five years of experience may apply the method without taking the course.

An assessment of a building condition can be requested by landlords who wish to benefit from the extraordinary updating of the rent value or by tenants who want to summon landlords to carry out maintenance and repairs. Before requesting an

Figure 3.
Photographs of windows classified according to level of defect

assessment, a mock assessment of the building is recommended. Landlords who get results that are lower than expected should then consider maintenance and repairs. The formal procedure starts with a request to the MAC, which selects an evaluator at random from the municipal pool. The evaluator contacts the landlord and the tenant to arrange a date for the inspection. The evaluator collects the information, fills in the checklist and submits it to the MAC. The maintenance coefficient is determined by the MAC which takes account of the report from the evaluator and the claims in the observations section. The results are communicated to the landlord and tenant, who may appeal in the event of disagreement. If the landlord accepts the results, but finds them lower than expected, maintenance and repairs can be done followed by a re-assessment. Within the next three years a re-assessment may be requested provided maintenance and repairs has been carried out.

A web site has been specially set up to support the implementation of the new regime (www.portaldahabitacao.pt/nrau). Landlords and tenants may download legislation and complementary documentation, make simulations of the building condition, request an assessment and check the progress of the processes. MACs can manage the municipal pool of evaluators, choose evaluators and communicate with them through the site. Evaluators can apply to pools of municipal evaluators, make appointments for inspections and submit checklists.

An assessment request is subject to payment of a fee: 75 per cent goes to the evaluator and 25 per cent covers the administrative costs.

4.7. Pilot

A pilot was set up to find out:

- if different evaluators would reach the same result for the same building;
- if the results would match an intuitive assessment by an expert;
- if the functional elements covered all the fundamental aspects of the condition of a building;
- if the instructions explained how to correctly apply the assessment method; and
- how long it took to perform an inspection and fill in the checklist.

A sample of 64 rented units was used, comprising 49 dwellings, ten shops and five offices. The distribution of the construction dates was: before 1755 – two units; 1755 to 1903 – ten units; 1904 to 1950 – six units; 1951 to 1983 – 30 units; after 1983 – 16 units. Most of these periods correspond with the enforcement of Portuguese building regulations which changed the dominant constructive typologies. Almost half the sample was made up of units dating from between 1951 and 1983 because the majority of rented units is from that period. Inspections were performed by 40 evaluators, 19 from LNEC and 21 from external bodies.

Each unit was assessed separately by at least two evaluators, leading to 183 checklists. The results were analysed and delivered the following main conclusions: the condition obtained from different evaluators was the same in 70 per cent of the units and a difference in the condition exceeded one level in only 5 per cent. Comparing the same unit, individual judgements about the defect level of each functional element were

the same in 76 per cent of the cases, the remaining 24 per cent were distributed uniformly across all functional elements.

After the inspections, the evaluators completed a questionnaire about the assessment method. The most relevant results were as follows: 67 per cent said their intuitive evaluation matched the result; 83 per cent said that no functional elements should be removed from the checklist; 90 per cent agreed with the evaluation criteria and more than 80 per cent with the calculation formula; 45 per cent suggested small changes in the weighting coefficients; and the majority agreed that the instructions were clear. Finally, the average inspection time was 40 minutes, but the evaluators claimed that this could be lowered to 30 minutes once they had more experience. The time, which did not include travelling or previous contacts with tenants, varied according to the size of the unit and the extent of the defects.

5. Discussion

5.1. Critical evaluation

Implementation of the assessment method started at the end of 2006. By the end of the first year, more than 1,000 evaluators were registered, 900 assessment procedures were completed and 3,700 were in process. Appeals arising from disagreements with the results were limited.

Several questions regarding implementation, presented mainly by evaluators and MACs, were answered by IHRU. These questions were expected, given that the method is new and evaluators could apply it without specific training during the first two years, So far, the implementation and questions have not raised unforeseen situations that would necessitate a revision. It appears therefore to be delivering satisfactory results.

Furthermore, the method was well accepted by other bodies. For instance, the Oporto municipality used it to make a survey of its housing stock and some organisations expressed an interest in using the results in the management of building stock.

5.2. Limitations

Despite the favourable evaluation, attention needs to be drawn to the limitations of the assessment method. The method does not assess structural or fire safety, identify illegal building practices or check out compliance with building regulations. It could provide opportunities for gathering information on these subjects, but this would necessitate more thorough inspections.

Since the results are used to determine fair maximum values for the rent of units, the assessment focuses on the impact of the condition of the unit on the living conditions of the tenants. A more thorough assessment would enable the causes of the defects to be identified and therefore support corrective interventions. However, it would also require more qualified evaluators, tests and longer inspections and thus push up the costs. The method is geared to balancing the accuracy of the results with affordable costs in terms of human and financial resources.

Tools and procedures were established to enable accurate and transparent application. However, the quality of the results depends heavily on the competence of the evaluator. Hence, the special training course is important to achieve the desired

objectives. MACs, when deciding the maintenance coefficient, check the description of the defects and the illustrative photographs. When they feel that the assessment criteria have been mistakenly applied, they can discuss this with the evaluator, who may then correct the evaluation. Landlords and tenants may also check out the results and appeal against them before they become definitive. Professional associations are informed if an evaluator repeatedly submits incorrect assessments. He will be investigated and, depending on the findings, may be excluded from the system. However, random checks of assessment results, with re-inspections by a supervisory authority, are not performed at present.

5.3. Future developments

"Severe" and "critical" defects describe situations that are not admissible because they constitute health and safety risks. According to the last census, a significant percentage of the housing stock is in poor condition, so these defects were included in the defect scale. In the mid-term, it is expected that the progressive improvement of housing stock conditions will make those levels less relevant. This improvement might motivate a review of the defect scale.

The assessment method was developed by a team of more than 30 researchers. During the process discussions were held with 15 organisations in the rented sector and a pilot was carried out. Nonetheless it is expected that the analyses of the results and practical experience will generate suggestions for further improvement.

References

Construction Industry Council (CIC) (1996), *Definitions of Inspections and Surveys of Buildings*, CIC, London.

Diário da Republica (2000), "Decreto-Lei no. 329-A/2000", 22 December, pp. 7444(2)-7444(4).

Diário da Republica (2003), "Decreto-Lei no. 287/2003", 12 November, pp. 7568-647.

Diário da Republica (2006a), "Lei no. 6/2006", 27 February, pp. 1558-2187.

Diário da Republica (2006b), "Portaria no. 1192-B/2006", 13 November, pp. 7708(9)-7708(15).

Ministre de la Santé, de la Famille et des Personnes Handicapées, Ministre de l'Équipement, des Transports, du Logement, du Tourisme et de la Mer (2003), *CIRCULAIRE DGS/DGUHC/SD7c/IUH4 no. 293 du 23 Juin 2003 relative à la mise à disposition d'une nouvelle grille d'évaluation de l'état des immeubles susceptibles d'être declares insalubres*, Ministre de la Santé, de la Famille et des Personnes Handicapées, Ministre de l'Équipement, des Transports, du Logement, du Tourisme et de la Mer, Paris.

NEN (2006), *NEN 2767-1 Conditiemeting van bouw- en installatiedelen – Deel 1: Methodiek*, NEN, Delft.

NEN (2007), *NEN 2767-2 Conditiemeting van bouw- en installatiedelen – Deel 2: Gebrekenlijsten*, NEN, Delft.

Office of Public Sector Information (2005), *The Housing Health and Safety Rating System*, Statutory Instrument 2005 No. 3208, HMSO, London.

Pedro, J.B., Aguiar, J. and Vasconcelos Paiva, J. (2006), *Proposta de uma metodologia de certificação das condições mínimas de habitabilidade*, Relatório no. 397/2006, LNEC, Lisboa.

Further reading

Ministério das Obras Públicas, Transportes e Comunicações (MOPTC) (2004), *O sector da Habitação no Ano de 2003*, MOPTC, Lisboa.

Pedro, J.B., Vilhena, A. and Vasconcelos Paiva, J. (2007), *Método de avaliação do estado de conservação de edifícios. Revisão e ilustração das instruções de aplicação*, Relatório no. 297/2007, LNEC, Lisboa.

Straub, A. (2007), *Dutch Standard for Condition Assessment of Buildings*, TU Delft, Delft.

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