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The National Register of Buildings and Dwellings in Switzerland and its role in the future housing census

Fritz Gebhard Federal Statistical Office <u>fritz.gebhard@bfs.admin.ch</u>

Chapter 1 The National Register of Buildings and Dwellings – an Overview

Chapter 1.1 The idea behind the national register of buildings and dwellings

Introduction

Since 1970 the Swiss Housing Census has been an integral part of the population census, which is performed every ten years and which supplies valuable information, not only on the number and structure of buildings and dwellings but also on living conditions.

Until now, the practice in the housing census was, starting afresh every ten years, to collect all the information by distributing questionnaires to every building owner and to all the property management agencies. The data were then recorded, checked for plausibility and evaluated. For the housing census of the year 2000 this process cost around twenty million Swiss francs (about 13 million Euros).

However, from long-term comparisons we know that over ten years about 70% of the data are, even after a decade or more, still valid. In consideration of the very high costs it became obvious that such data should be managed in the form of a register.

From direct census to register-based statistics

In 1998, the Swiss parliament instructed the Federal Statistical Office (FSO) to develop further the concept of a register-based population census, and the principal aims of this modernisation were set out as follows:

- Reduction of demands made on respondents
- Reduction of costs
- Improvement in the quality of the results

Preconditions for the success of such a register-based census included, besides the availability of harmonised and standardised registers of residents (which are actually maintained separately by each municipality), the existence of a national register of buildings and dwellings.

Based on a legally binding mandate, the FSO proceeded to create such a register, in which all basic data on buildings and dwellings in Switzerland are recorded for statistical and administrative purposes. This proved to be desirable and necessary because existing data were incomplete and heterogeneous.¹

Uses of the national register of buildings and dwellings for statistical purposes

From the statistical standpoint the RBD meets many requirements, the most important of which are illustrated in Figure 1.



FIGURE 1. Uses of the national register of buildings and dwellings for statistical purposes

The main purpose of the RBD is to provide basic data for the future housing census. In connection with the modernisation of the population census, the RBD is of fundamental importance in the harmonisation of the registers of residents, in that every person is allocated a dwelling number from the RBD and can therefore be associated with a particular household (identification of household structures).

The X-/Y-coordinates of the Swiss topographical grid are recorded in the RBD for all buildings. By allocating building numbers from the RBD, not only to persons but also to other statistical units such as workplaces and companies (called "geocoding"), the information derived from these statistics can be analysed and evaluated on geographical information systems (GIS).

Further uses for RBD data include, for example, statistical extrapolation and the selection of respondents for random sampling.

Chapter 1.2 The national register of buildings and dwellings goes online

The RBD has been in service since January 2002, and is administered by the FSO in close cooperation with the cantons and municipalities. Several cantons have their own registers of buildings and dwellings, managed according to the requirements of the FSO, or plan to implement such registers in the near future.

¹ Switzerland is a country with a very pronounced federal structure which recognises the three administrative levels of Federation, Canton and Municipality. Most of the executive functions are delegated to the cantons or the municipalities, and naturally the characteristics of the registers are variable and non-uniform. In only 19 of the 26 cantons, for example, does there exist a state-run housing insurance coupled with a corresponding housing register, and even where such schemes exist they are subject to varying executive provisions. Even official surveying is subject to procedures specific to the individual cantons.

The data content of the national register of buildings and dwellings

The RBD includes all buildings which are used totally or partially for habitation and also details of the dwelling places within. Houses which are not used even partially as habitation may nonetheless be included in the register according to the demand of the canton or the municipality concerned, but the federal administration does not stipulate an obligation to update these supplementary records.

Every building and dwelling in the RBD is allocated a nationwide-unique and unambiguous identification number (EGID and EWID respectively). In addition to this number, basic data on age, size, power supply, etc. are recorded in the RBD. Information on occupants, ownership, rent and similar are not however included.

In the Appendix to this report there is a diagram of the structure and content of the RBD.

Data sources and updating

The original data for the RBD were extracted from the housing census, which was part of the population census in the year 2000, and the source-data migration was performed in three stages between August 2001 and May 2003. Only the data acquired in the population census of 2000 by direct questioning of building owners and property management agencies were migrated: Data which resulted from statistical processes for correction and interpolation were not migrated.

In contrast to the housing census, updating for the purposes of the RBD will no longer be based on the direct questioning of building owners and property management agencies, but will be supplied by the municipal construction authorities who are responsible for processing construction applications and approvals. Within the scope of the annual construction statistics, the construction authorities will report at least annually all projects or plans subject to construction approval and will in addition report all buildings and/or dwellings which have been built, converted or demolished since 2001.

Data collection using Internet

Data for construction statistics and for the updating of the RBD were compiled together for the first time in 2002 (relating to all events of the construction period for the year 2001).

The FSO has made available for this purpose an Internet application which enables the construction authorities to not only review all recorded information on building projects, as well as on existing buildings and dwellings in their area, but also to update and correct such data. This is, in the terminology of the national strategy for e-government, a "transaction orientated G2G (government to government) application".

It goes without saying that it remains possible for construction authorities to submit their statistics to the FSO using the traditional questionnaire, and this method continues to be preferred particularly by small municipalities with limited construction activity. After scanning,, the data are imported via the appropriate interface into the FSO Internet application for further processing.

In larger municipalities and cities, the construction authorities employ fully integrated digital information systems, and for these the FSO Internet application has an integrated interface, able to import and process data from such external information systems, so avoiding the necessity of entering the same data twice in two separate systems.

Number of census offices 2001-2006

Number of construction projects 2006



FIGURE 2. The process of data collection: development and progress

Figure 2 shows how the various procedures for data collection have developed in the last six years. We see that online entries have increased rapidly since the beginning, in 2001, and that although the direct data transfer is used by relatively few authorities, these are still the larger data suppliers. The "special cases" are authorities which use their own specific procedures for generating the data for the annual construction statistics, and which still have to adapt these solutions before the new requirements of the coordinated data collection system come into effect.

Chapter 2 Measures and techniques to ensure quality

The demands on the RBD are very exacting: The FSO requires current, complete and correct information on all buildings used totally or partially as habitations, as well as their dwellings, and this is to be achieved without any direct survey involving building owners or property management agencies.

The essential statistical requirements which the RBD must fulfil are as follows:

- The totality of buildings and dwellings must be recorded in a reliable way: In particular, there must be neither double entries nor omissions in the register, which would lead to overor underestimates of the number of buildings or dwellings.
- For every building and dwelling in Switzerland, there must be one unambiguous and unique number: This number is called either "National building identification number" (EGID) or "National dwelling identification number" (EWID), and these identifiers remain on record even after their reference building or dwelling has been demolished. They are not reallocated.
- Information on the buildings and dwellings must be complete, plausible and current. In other words, all required data must be available without inconsistencies and must be up todate.

A series of functional, organisational and technical developments are necessary to fulfil all these requirements, as explained below.

Chapter 2.1 Harmonising definitions and terms

In order to administer or manage the RBD, the FSO has to work with various partner organisations (see Chapter 2.4). These organisations must understand and employ the same definitions, terms and criteria (codes). As in other countries, the definition of a building (or house) is a particularly difficult challenge.

Numerous bodies and organisations in the public and private administrations work with the term "house" or "building" and, as long as they are dealing with free-standing structures, they are widely in agreement. However, as soon as the topic deals with combined units, differences arise, as shown in the following examples:

- The official surveyor considers individual parts of a single structure to be separate buildings when they have different owners.
- For building insurance assessors, combined units with similar values and risks are not independent and separate buildings.
- The Post Office considers all addresses to which letters and packets are sent as separate buildings.

For register administration (and statistical) purposes, the definition of a building was formulated to ensure that the number of buildings listed in the RBD changes only when one is newly constructed or an existing one pulled down: A change in ownership or address, for example, must not result in any change in the number of buildings or dwellings recorded. The phrasing of the definition employs technical construction considerations to determine whether or not parts of a common structure are classified as the same or as separate buildings.

The definition of a building and detailed explanations of the attributes and criteria used in the RBD were published by the FSO in 1999 in the form of a "catalogue of attributes". Since 1999, the catalogue of attributes has changed very little, but a major revision is now in preparation.

The effect of this catalogue in the cantonal and municipal offices was remarkable: Hardly any were in complete agreement, but many saw a unique opportunity to adapt their own definitions and criteria to a binding standard (nickname: "The Blue Bible" because of its blue cover) which allows them to easily exchange their data with other administrative agencies. Obviously, the FSO also benefits, as data collection for the RBD is made easier.

Chapter 2.2 Real-time entries and online availability

On the technical level, the data management of the RBD is intended to record all data as closely as possible to their original source. In the case of the RBD the construction authorities are the primary source of data.

Using the FSO Internet application, data on buildings and dwellings can be entered by those responsible in the construction authorities' offices at the time of an application for building permission, thus even before construction has been started. The data are transmitted directly to the FSO server and are saved in the RBD databank. This happens in real time and means that as soon as the data are saved, the external operator sees the identification number allocated to the new building, and he can check his entry for errors. The new entry is available also in other administrative offices and can be downloaded as necessary.

Figure 3 shows the RBD information system architecture.



FIGURE 3. The RBD information system architecture

The RBD information system gives a considerable advantage to all local construction authorities in that all RBD data on their own and other municipalities are immediately up to date and available to everyone.

The RBD system gives the FSO the possibility to monitor the entries as they are made, and, when mistakes or problems in dealing with the system requirements arise they can support the operator by telephone or by e-mail. Sometimes in the early days this online "look over the shoulder" produced operator reactions ranging from astonishment to fear, but in the meantime it has become valued, and contributes significantly to the quality of the RBD data.

The advantages described apply to construction authorities which enter their data online using the FSO Internet application, whereas those which have their own individual systems and which submit their data to the FSO on a carrier medium (see Chapter 1.2), cannot benefit. However, as the number of these offices is increasing, the FSO is working on a system using web services for connecting such applications directly to the RBD databank, and according to current planning this should come into service in November 2007.

Chapter 2.3 Continuous quality control and documentation

The RBD must be as up to date and free from errors as possible, and must be flexible enough to handle incomplete and unreliable information, but must still permit the user to be informed at any time of the quality of the data and of outstanding error reports.



FIGURE 4. Conception of quality control in the RBD

Figure 4 illustrates the principles according to which the RBD data quality is analysed and documented.

Before data entered online or imported from external systems are saved, they will be checked for validity. Data will be accepted as valid when they are correct in form, and when all necessary key variables are complete. Should the validity rules be violated, the system will react, depending on the class of error, in one of three ways, as shown in the figure above.

After the online or imported entries have been saved, the data on the buildings and dwellings in the RBD are subjected to a further series of checks for plausibility and completeness. Again, should any rule be infringed, the system has three ways of reacting depending on the type of error.

At any time, the online RBD user can use the system to verify the data he administers, and can thus bring himself up to date concerning the condition of the data for which he is responsible. This can be done for each individual building and the results not only state the data quality but also list unresolved error messages.

The communal construction authorities are required to correct and complete all their data in the RBD, so that they meet the FSO minimum quality standards in time for the population census in 2010.

Chapter 2.4 In partnership and cooperation

The FSO conducts the national RBD and coordinates the updating of the register with the data collection for the construction statistics. It is primarily a register compiled for statistical purposes and is seen as such by most of the communal construction authorities. Therefore, the technical provisions described above cannot prevent the motivation and commitment to conscientious compilation and maintenance of the data from being less in some communal construction authorities than is desirable.

For this reason, the FSO endeavours to involve bodies and organisations in both the public and private sectors as partners in the management of the register, so that duplication of registration can be avoided, synergies developed, and the advantages and use of the RBD more widely appreciated.

Administration of the register in the cantons

The legal stipulations around the RBD allow, under certain circumstances, the delegation of the administration of the RBD to the cantons. The intention behind this provision is that the cantons, provided that they wish it and are ready to make the necessary capital investment and meet the operational costs, can integrate the RBD more tightly into their administrative processes.

The basic requirements for the setting up of a cantonal RBD are:

- a cantonal legal basis for a cantonal RBD
- fulfilment of the technical requirements and the guidelines concerning the content

When these requirements are met, the FSO accepts a copy of the cantonal RBD into the national RBD. The canton is responsible for the conduct of the cantonal RBD; The FSO is limited to the observation of the technical guidelines and the guidelines on content, as well as to the supervision of the development of data quality.

Today, although six of twenty-six cantons now have their own cantonal RBD incorporated into the national RBD with one in preparation, the expected quality standards compared with those of the national RBD have not yet been achieved. This could be because the integration of the RBDs in the cantonal administrative processes is still in its infancy.

Data exchange with official surveyors' offices

Significant information such as coordinates, identity numbers of land parcels and addresses of buildings originate from official surveys or are otherwise available in the records of survey offices. Therefore, the FSO has cooperated with official surveyors ever since the initiation of the national RBD, and has migrated as necessary - and according to usefulness – their data into the RBD.²

In a common project, the FSO is working closely with the Swiss Federal Office of Topography (swisstopo) to develop further and institutionalise data migration between the two bodies. The object is to harmonise surveying and the updating of the RBD, as well as to coordinate reporting processes at the cantonal and municipal level in order to reduce the workload of the communal construction authorities.

The results the FSO expects from this cooperation are: improved reliability in the reporting of changes by the communal construction authorities; and access to high-quality survey results used in the localisation and identification of buildings in the RBD.

The value of postal addresses

The Post Office administers extensive information on addresses, street names and postal codes. The FSO receives data extracts quarterly from the Post Office and compares them with those of the current RBD.

The FSO, together with the Federal Office of Topography, is exploring possibilities for further cooperation with the Post Office.

Chapter 3 Towards a register-based housing census

The RBD constitutes the data foundation of the future register-based housing census. This demands a radical renewal of the present census process, and with this in mind the FSO has launched a project called "Casa".

The objective of "Project Casa" is to introduce the new housing census in 2010 and to conduct it annually thereafter.

Chapter 3.1 The housing census as part of the population census

In accordance with the joint recommendations of the United Nations Economic Commission for Europe (UNECE) and the Statistical Office of the EU (EUROSTAT), future housing censuses are to be integrated into the population census.

² In Switzerland official surveying is performed by the cantons, and at federal level there is no administration of data generated from surveys. Therefore, no redundant data management will result from the transfer of cantonal survey material to the national RBD administered at federal level.



FIGURE 5. The basic structure of the population census and related censuses

The population census produces data on various statistical entities such as persons, households, houses and dwellings, which are cross-referenced using the building and dwelling identification numbers (EGID and EWID respectively).

- Every person is part of either a private or a collective household.
- Using the EGID-EWID, private households are associated with a particular dwelling, and thus the proportion of the dwelling stock occupied can be derived.
- The EGID associates every dwelling, whether occupied or not, with the building in which it is located.
- Collective households generally do not occupy a dwelling in the sense of the RBD. They are therefore linked directly to a building using the EGID.
- All buildings with dwellings and those linked to a collective household are considered as buildings used for human habitation. These make up a proportion of the total housing stock.

Using these cross-references, it is possible to extract from the housing census information on buildings and dwellings, as well as on living conditions.

Chapter 3.2 Register-based data streams and processes

The following figure shows the main data sources and processes of the future housing census.



FIGURE 6. Data sources and processes of the register-based housing census

The future housing census is based on various data sources.

The principal source of data for the future housing census is the RBD, coordinated and updated according to the annual construction statistics (see Chapter 1.2). Regular data exchanges with the official surveyors' offices and with the Post Office (see Chapter 2.4) provide the current X-/Y-coordinates of the buildings and check that all buildings have been recorded. Additional data drawn as available from administrative registers will be used in the census process to ensure on the one hand the quality and currency of the RBD data and on the other hand to evaluate additional building and dwelling information for statistical purposes.

The communal registers of residents with their harmonised information on individuals are a second important data source for the future housing census. As part of the harmonisation of the municipal registers of residents, every person will be allocated the building and dwelling numbers (EGID and EWID respectively) of the RBD. Linking the persons to the dwellings data of the RBD makes possible the register-based identification of household structures and delivers the most important information on living conditions.

Attributes which are not recorded in the existing registers will be collected by an additional annual random sample survey, which will involve only private households. Neither building owners nor property management agencies will be approached.

Building and dwelling data from the RBD, personal data from the harmonised registers of residents, and the results of the sample surveys will be checked and corrected. For reasons of economy, incomplete and/or incorrect data will be rectified within the limitations of statistical acceptability using a special procedure for substitution and correction.

The buildings in RBD are all geocoded, which permits the presentation and evaluation of the data for very small geographical areas. Verified information will be made available in the FSO internal data warehouse (CODAM), and the basic data will be published in the form of tables, diagrams and analyses.

Chapter 4 Conclusions

The national register of buildings and dwellings is compiled primarily for statistical purposes and is required to include complete and correct information on all buildings used as habitation and on the dwellings within, so that extensive questioning of building owners and property management agencies will no longer be necessary.

To meet these stringent requirements, a high standard of quality assurance is essential. Consistent source data management and close cooperation with the cantons and municipalities are particularly important for the quality and currency of the collected data.

On its own, the RBD is insufficient for the implementation of the future housing census. The inclusion of data from other registers and the selective employment of random questioning or interviewing are unavoidable.

On the other hand, the RBD has many uses above and beyond those of the housing census. It serves, for example, not only as a foundation for geocoding for other surveys, but also as a basis for statistical extrapolation and the selection of respondents for random sampling.

References

Further information on the national register of buildings and dwellings in Switzerland is available under <u>www.housing-stat.ch</u>. Many important documents on the RBD (eidgenossisches Gebäude- und Wohnungsregister, GWR) can be downloaded (only in German or French) from this site.

The author is pleased to answer questions or to supply additional information. He may be contacted at the following e-mail address: <u>fritz.gebhard@bfs.admin.ch</u>

Appendix

Model and content of the Swiss register of buildings and dwellings



Building

EGID

Municipality Land plot Building coordinates Status of building Typ of building Age of building Size of building Heating / hot water

Building entrance

EGID + EDID

Building address Postal code – Place

Street

ESTRID + ESTRSX

Municipality Postal code – Place Name (full/short/index) Validity Street number Numbering system Geometry

Dwelling

EGID + EWID

Floor Dwelling numbers Description of location Status of dwelling Size of dwelling Cooking facilities Purpose of use