

Quality Improvement in the Cadastral Procedure as a part of a Continuous Professional Development (CPD)

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SUMMARY

This paper describes the work with competence at Lantmäteriet Cadastral Service Division. The paper gives first a general introduction to the cadastral procedure in Sweden, definitions of competence, CPD and then how CPD is a success key in the quality work.

The cadastral procedure in Sweden has a long tradition and since millennium includes cadastral process also updating of the Cadaster register and the connecting digital cadastral map. The process has an excellent reputation in the community and among the citizens. The cadastral system is transparent and effective. During many years the system gradually has been developed to regulate new types of relationships between real property units, eg new forms of collaboration between property units.

The overall objective of the cadastral system is high quality in the cadastral process by unity of law, good service and information, and fast, accurate and cost-effective processing. The single most important factor in achieving this is to have competent employees. This paper describes needed competence of the cadastral surveyor.

At a time when there is competition for cadastral surveyor it is extra important to find models to develop employees so that the cadastral surveyor's competence can take on increasingly complex tasks. Lantmäteriet has in the Cadastral Service Division developed a model where introduction and continuous professional development (CPD) are important components to achieve this. CPD consist of both formal and informal parts and is implemented in a planned way.

Another important component is the classification of each cadastral procedure according to its complexity. Since the entire cadastral process can be handled digitally, the process can be allocated to cadastral surveyors across the country. The field survey can be carried out by a field surveyor nearby and the rest of the cadastral process by a cadastral surveyor at an office anywhere in the country.

Basic conditions are access to guide lines, regular consultations between the employee and the manager, an open working atmosphere and of course well educated cadastral surveyors.

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1 SWEDISH CONDITIONS

1.1 Properties and Cadastral Procedure

All land and water in Sweden is divided into real properties. The cadastral authorities conduct cadastral procedures in order to define or alter properties and rights. The cadastral authorities also help to resolve issues related to land access when roads are to be built or cables to be laid, for example. During many years the system gradually has been developed to regulate new types of relationships between real properties, eg special type of rights for broadband cables.

The cadastral procedure in Sweden has a long tradition and is known to be transparent and effective.¹ The cadastral process includes decisions of juridical, economical and technical art. Since millennium the cadastral procedure includes updating the Cadastral register and the connecting digital cadastral map. The whole cadastral procedure is digitalized. Since ten years the archives are also digitalized.

Because the entire process is digitalized it is possible for a surveyor everywhere in the country to handle a cadaster process everywhere in the country.

From the 1 July 2015 it is also possible for interested parties to attend by video or telephone.

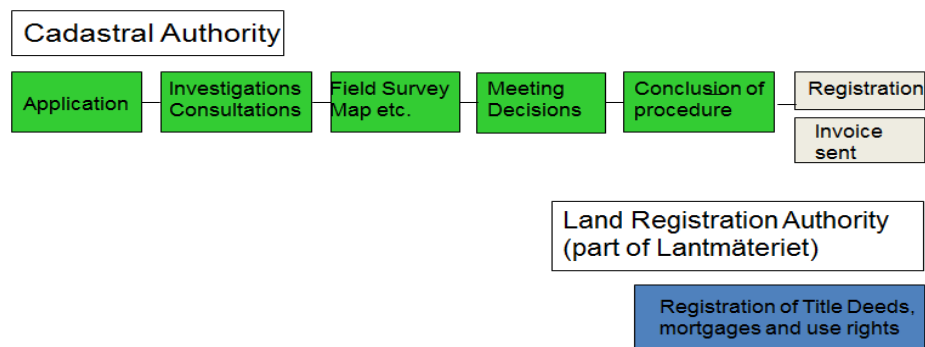


Fig 1 Cadastral procedure in Sweden

¹ Swensson Ewa & Juulsager Torben: Transparent Cadastral System – in both private and public task performance, FIG Congress 2014, paper no 6957

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Before a cadastral surveyor updates the register all documents in his cadastral procedure are reviewed by a colleague in a special template. Any errors are corrected and recorded for follow-up if there is a systematic error. To amend the process and correct the systematic errors maybe better instruction or training is needed.

Besides these every day quality work Lantmäteriet also have regular discussion with groups of interested parties about how they think the cadastral procedure works and which improvements are needed.

1.2 Lantmäteriet and Cadastral Authorities

Responsible for the cadastral procedure is the governmental organization Lantmäteriet, the Swedish mapping, cadastral and land registration authority. The Government may, on application from municipality, give the municipality permission to conduct cadastral processes. The requirements are that the municipality should have a certain amount of cadastral cases and at least employed a minimum number of cadastral surveyors. Now it is 39 municipalities with this permission². The cadastral authorities, either as a part of Lantmäteriet or in a municipality, have offices all over the country.

Lantmäteriet Cadastral Service Division´s staff is responsible for providing support and guidance to the cadastral authorities, both in municipalities and in Lantmäteriet. In practice it means that this organization is responsible for developing the special technical systems needed to conduct an effective cadaster procedure and for giving technical support to these technical systems, producing guidelines for law enforcement and organizes courses and seminars. Supports to the technical systems, guidelines and so on are all available at Lantmäteriet internal website, which is open also for the cadastral authorities in municipalities. Another opportunity is to get personal support via telephone or computer from Lantmäteriet helpdesks.

Lantmäteriet can decide how the cadastral procedure shall be conducted in cadastral authorities in Lantmäteriet. Discussion of this often occurs with representatives from the municipal cadastral authorities.³

Another part of Lantmäteriet, the Chief Legal Counsel, has a supervisory function of the cadastral authorities in municipalities.

Government has set the following goals for the cadastral work at Lantmäteriet and the cadastral service division:

“The cadastral process should be characterized by unity of law, good service and information, and fast, accurate and cost-effective processing. The information is transferred to the Land Registry to be timely and reliable”

² There are 290 municipalities in Sweden.

³ Swedish Government Appropriation Directions to Lantmäteriet 2015 (in Swedish)

Lantmäteriet work hard to implement the goal given from Government. It is important to have a unified cadastral procedure, cadastral order and a cadastral procedure cost independent from where and by whom the cadastral procedure is carried out. That is why knowledge of the guidelines and daily quality works are a part of the surveyor's job. All managers are responsible for ensuring that work is done in accordance to guidelines.

All employees in Lantmäteriet cadastral service department are divided into groups of about eight people with their own manager. The manager regularly organizes staff working meetings, discussing common issues. The aim is to get a uniform cadastral procedure and suggest improvements. Some of the improvements are handed over to the Cadastral Service Division's staff.

1.3 Cadastral Surveyors

The cadastral organizations are responsible for the cadastral procedure. In the organizations there are employees with different duties to carry out the cadastral procedure, such as cadastral surveyors, technical surveyors and administrators. The cadastral surveyors are responsible to drive the whole cadastral process but they are not personally liable. As a part of the cadastral procedure the cadastral surveyor also have the power to make decisions when not all landowners agree, eg on economic compensation for land transmission. This requires great skills of the cadastral surveyors to be able to handle different types of interested parties. Maybe it is because the profession as a cadastral surveyor in Sweden relate mainly to law, economics and management of people and not field surveying as it is so popular among women? More than half of cadastral surveyors are women.

There are no formal training requirements to be a cadastral surveyor. It is the managers at the various offices that make an individual evaluation of each person. In practice the cadastral surveyors always are well educated. Most of them have a master's degree in Surveying or Built Environment from Technical Universities. The master's degree includes law and economics - especially in real estate-, mathematics, geodetics, natural resources and physical planning. Due to lack of students with this kind of exam even students with other educations are employed, eg lawyers or planners. In these cases the cadastral surveyors need a lot of assistance from technical surveyors and sometime also from property valuers. But some of them can also through courses and work with others becomes independent cadastral surveyors.

Most of the technical surveyors have a bachelor's degree in surveying. They make most of the field surveying. If there are disputes among the property owners the cadastral surveyor always assists. Some of the cadastral surveyors always make field surveying in their own property procedures.

There are total about 800 cadastral surveyors working in 80 offices in Sweden. In the smallest cadastral office only two cadastral surveyors work, in the biggest it could be 100 cadastral surveyors working (Stockholm). The young generation of surveyors change job frequently. In our complex society there is a need of cadastral surveyor in more organizations than before, for example in municipalities for economics reasons, construction companies, the Swedish

Transport Administration etc. It is a challenge for the cadastral authority to give the new recruits an effective introduction and a good continuing professional development (CPD).

More information of how Lantmäteriet works to recruit personnel is given in FIG paper no 7585.⁴

2 COMPETENCE AND CPD

The common definition of competence is “The ability to do something successfully or efficiently”.⁵

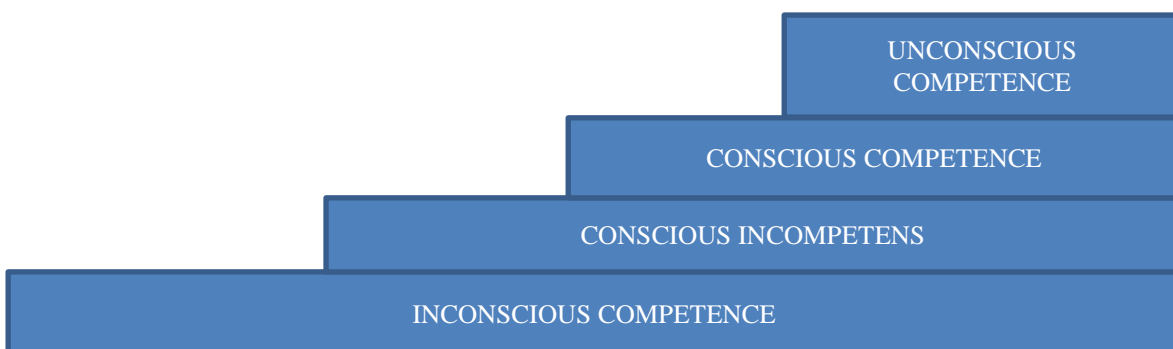
I want add some points from FIGs “Statement of Ethical Principles and Model Code of Professional Conduct”:

Surveyors

- maintain their knowledge and skills, keep abreast of development in their fields of practice and apply their expertise for the benefit of society;
- only take on work that they reasonably believe they will be able to carry out in a professional manner; and
- exercise care in the performance of their duties⁶

2.1 The Nature and Definition of Continuing Professional Development (CPD)

I theory there are four stages in development of all types of competence:



At the first stage you think you know a lot because you perhaps are newly graduated. At the second stage you in a sometimes painful way understand that there is much you don't know.

⁴ “ Human Resource Provision and Capacity Development: Recent Initiatives at Lantmäteriet in Sweden” by Kristin Land and Jesper M Paasch.

⁵ www.oxforddictionaries.com/definition/english/competence

⁶ FIG Publication no 17 “Statement of Ethical Principles and Model Code of Professional Conduct”

You are very motivated to learn more. At the third stage you satisfactorily realize that you are competent in your profession. At the fourth stage you have practiced your competence, often in new situations and combining different parts of your knowledge and skills without thinking about it.

A common definition of continuing professional development (CPD) is

“Continuing professional development (CPD) is a continually updating of skills and knowledge in order to remain professionally competent and archive the person’s true potential.”⁷

The key features of effective CPD as per FIG is:

- **Continues** – throughout the practitioners working life⁷
- **Professionally/organizationally focused** – necessary for the execution of professional and technical duties and related to “maintaining the quality and relevance of professional services”
- **Broad based** – knowledge and skills and the development of personal qualities
- **Structured** – systematic maintenance, improvement and broadening⁸

2.2 Formal and informal CPD

CPD could be both formal and informal. It is easy to measure the formal CPD, eg how many days a course is or how many points it covers. It is more difficult to measure what one has learned in a project. Below are some examples of formal and informal CPD activities from RICS⁹:

CPD Activity	Formal	Informal
Professional courses, seminars	X	
Structured seminars/discussions where there is a learning outcome, for example leading an online webinar on technical topic	X	
Informal teaching/ training for others, such as facilitating a discussion session at a seminar or conference		X
Self-managed learning which is formally assessed by a third party subject expert	X	
Taking part in online events/viewing video session relating to your professional role where there is a clear learning outcome	X	

⁷ www.RICS.org

⁸ FIG Publication no 15 CPD- CONTINUING PROFESSIONAL DEVELOPMENT and its future promotion within FIG

⁹ www.RICS.org

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Private study such as:		
<ul style="list-style-type: none"> • Reading online or paper based trade publications, manuals, professional briefs, journals • Listen to podcasting relating to your professional role 		X
Delivering a presentation on a technical subject where research and preparation have been required to enhance your own understanding/knowledge	X	
Delivering a presentation on a technical subject that you are already an expert in and little or no research or preparation have been required		X
Mentoring (providing instructions, guidance and support to trainees or students)		X
Work in an international working group, eg FIG		X

3 COMPETENCE IN LANTMÄTARIET

3.1 General

In knowledge organization the employees´ are the most important production means. The short definition in Lantmäteriet is “*ability to solve a task*”. It is not enough to describe survey, evaluate or define competence in traditional terms. Lantmäteriet have made a more descriptive definition on competence. This is rather a kind of classification scheme to describe the employees´ current and desired competence. In practice this is done in five dimensions. These are:¹⁰

- ***Vocational technical skills***

Practical skills required to **perform the work** properly. This is about theory in the area of question, methods, laws and use of the technical systems and guidelines. This dimension is the easiest to measure of the five. Traditionally, it is the skills that are most common.

- ***Strategic competence***

The strategic competence has a strong connection to **understanding of the organization where you work**. It is important to have a good understanding of the mission, objectives and background to the focus. A prerequisite is curiosity and

¹⁰ Internal webpage in Lantmäteriet 2015-02-19

interest in the world - both externally and internally. It requires an understanding of what happens in the workplace and in the wider world and an ability to analyze trends.

These two dimensions are together the **knowledge** we need to fulfill our tasks.

- ***Social competence***

Interaction with others and the ability to **communicate** both between individuals and between groups is the core of the social dimension. In the future, workplaces become more heterogeneous. The working methods will also change. Good social skills is seen particular in that you can work well in different contexts and to develop, maintain and exploit contacts and networks. This dimension is in contrast to previous not easy to measure and requires a much more long term vision development.

- ***Personal competence***

Sense of ethics, ability to show consideration, respect, responsibility and creativity are the characteristics of one's **own personality**. This is also about good self-awareness and maturity. This dimension will have an increasingly important since the complex situations increases.

- ***Functional competence***

This dimension is about **getting everyday to work**, to use the different skills and talents in a meaningful way at the right time. This shows how to combine the different abilities, skills and knowledge in different situations. That dimension depends on experiences.

In summary: the three last dimensions are the **abilities** we need to solve a specific problem.

3.2 Requirement for the Cadastral Surveyors Competence

To ensure the quality of cadastral management, it is important that the cadastral surveyor has the right skills to conduct the cadastral procedure. For that reason all cadastral surveyors in Lantmäteriet are divided into skill levels. A stairs with four steps are defined. This clarifies which types of cadastral procedures the surveyors are qualifying to conduct.

All new cadastral surveyors must pass through an introduction plan called Lantmäteriakademien (Academy of Surveying), “entry-level training”. In this “entry-level training” are courses and own work with cadastral procedure mixed with work together with supervisor and colleagues. The courses include legislation, evaluation of real properties and water, mapping, geodesy and how to manage the IT system in use. The education also includes how to interact other people. To complete the full “entry-level training” interspersed with own work takes 3-5 years.

The surveyor has continues discussions with his or her manager of what and when the next step will be. This is a short description of the steps¹¹:

Level 1 Preparatory cadastral surveyor

Tasks:

- investigates and prepares decisions and minutes
- render decision
- assisting a decision making cadastral surveyor in complex cadastral procedure

Other:

- has basic knowledge about the subject area
- are beginners in "entry-level training"
- work sometimes in team projects

Level 2 Decision-making cadastral surveyor

Tasks:

- investigates, conduct and decides cadastral procedure where all interested parties agree
- conduct largely cadastral procedure - independently
- make interpretations of the law by means of guidelines
- hold cadastral procedure meetings

Other:

- has theoretical and practical expertise
- has at least passed the learning outcome of the first semester in the "entry-level training"
- personal characteristics: has good communication skills both written and verbal, responsive, energetic

Level 3 Specialist cadastral surveyor

Tasks:

- conduct cadastral procedure mainly of analytical and evaluative nature
- work independently - only fundamentally important issues discussed with colleagues
- make interpretations of the law by means of guidelines and practice
- hold meetings where not all interested parties agree and where the outcome is uncertain

Other:

- has broad and deep knowledge, passed all required courses in the "entry-level training" and some valuation courses

¹¹ Internal webpage in Lantmäteriet 2015-02-15

- personal characteristics: has very good communication skills both written and verbal, responsive, teaching skills, ability to handle conflicts amongst concerned parties or the society, energetic

Level 4 Senior cadastral surveyor

Tasks:

- conduct cadastral procedure with high complexity which are of analytical and evaluative nature and which have significant element of planning
- makes legislative interpretations by different law and cases interpreting
- as a part of the cadastral procedure, handle large extent conflicting interests amongst concerned parties or the society, disputes and acting by compulsion
- contributes to the development of the cadastral procedure
- participate in internal and external networks in their field

Other:

- participate in internal and external networks in their field
- has deep and thorough expertise in cadastral procedure, legislation or real estate valuation
- personal characteristics: has very good communication skills both written and verbal, responsive, very good teaching skills, very high ability to handle conflicts among concerned parties or the society, energetic.

Central to this development stages are the conversations taken place regularly between the cadastral surveyor and his or her manager. These discussions are carried out every two weeks in the working group and individually at least two times a year. All cadastral surveyors also have a supervisor when he or she is newly employed.

4 PRODUCTION COUNTERVAILING

As stressed earlier it is important to have a similar cadastral process and cadastral order independently from where and by whom the cadastral procedure is carried out. This uniformity refers to how the cadastral procedure is conducted, the contents and format of documents, decisions, costs, and how long time the cadastral procedure takes. To ensure consistency with high quality, it is important that the cadastral surveyor with the right skills conduct the case.

The Swedish cadastral system includes both simpler types of cadastral procedure, eg subdivide one property and more complicated types such as decide a railway line. In the last example the cadastral surveyor often must decide without agreement among interested parties and also make an evaluation and determine economic compensation. To be sure that every cadastral procedure is conducted by a qualified cadastral surveyor all cases in Lantmäteriet are classified by the complexity of the application. Sometimes when there is supplementary applications during the cadastral process the case will be reclassified. If for example the Swedish Transport Administration wants many cadastral procedures where there are conflicts among interested parties, cadastral surveyor from the whole country can conduct this. It is

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possible through the full digitalized system and the possibility to use video or telephone for meetings.

Big cadastral procedure are organized as projects with many people involved, such as preparatory cadastral surveyor, field surveyor, administrator and a cadastral surveyor with experience. But there is always *one* cadastral surveyor responsible for the whole case.

5 CPD IN LANTMÄTERIET'S CADASTRAL SERVICE DIVISION

A central part in Lantmäteriet Cadastral Service Division is to introduce new cadastral surveyors to make them able to conduct the simple cadastral process consistently in a legally secure manner. Next step is to get the cadastral surveyor ready to conduct more complex cadastral procedure. In the cadastral surveyors way to achieve higher competence is the model to describe requirements as seen in part 2 above a help. The discussion between the manager and the cadastral surveyor is based on skill levels described in 3.1. There is a lot of formal and informal CDP the manager and the cadastral surveyor can agree on. Besides daily tutorial, every two week discussions in the working group are the individual action plan drawn up between the cadastral surveyor and the manager important. These plans may for example include participation in a development project, to represent Lantmäteriet externally and to participate in an international conference like FIG.

6 CONCLUDING REMARKS

We live in a time where many young people change jobs frequently and community citizens require a fast and legally secure conduct of the cadastral process. Lantmäteriet has met this challenge by considering the skills of the cadastral surveyor as the most important factor in order to maintain high quality. The manager's responsibility is to get the right person to conduct cadastral procedure based on their skills. The manager must then ensure the entire countries' needs, not just his office's. The manager's supporting role can not be over-estimated. Small workgroups and regular conversations with employees, combined with supportive material is an important success factor. And at last: *staff's pride of their work.*



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www.rics.org

[Lantmäteriet Internal webpage 2015-02-19](#)

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