

# Life Long Learning Educational and Training Services Situation Depending Measuring

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**Keywords:** Capacity Building, Cost Management, Education, GNSS/GPS, Professional Practice

## SUMMARY

In recent years, a lot has changed for land surveyors in the Netherlands:

- Many new tools: Measuring with GPS has become the standard. The measuring portfolio was exchanged for a tablet. Also, there are digital sketches;
- Going solo: New tools make it possible for the surveyor to travel alone. No need for assistance anymore;
- Work at home: New tools make it possible to process measured data into a cadastral map from their own home.
- There is increasing contact with customers;
- More management control is focused on the quantity and quality of work.

As a consequence the land surveyor obtains less skills and experiences in the art of measuring and has less regular contact with colleagues for peer review.

That is why Kadaster started two initiatives at the end of 2013:

1. Workshops to raise awareness amongst surveyors on how to use current resources effectively and to determine relevant measurement points. And how to interpret the regulations with all the changes.
2. Management control at the end of the workshops.

### Develop the workshops.

The developers of the workshops are all working in the surveying process: surveyors, process managers, surveying experts and managers. They were supported by a core team with a project leader, a process manager and a HR advisor.

### Testing the workshops.

Each workshop was presented by a developer to the core team, the workshop facilitators and the other workshop developers. The tips and ideas were processed into the workshop. Each workshop also was tested to a group of surveyors. Only after that test, they were given locally to surveyors.

### Results

The workshops were well received by the surveyors. They have become more aware of the opportunities of the current resources within their field of work. During the workshops there were good discussions on the case histories.

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Management control at the end of the workshops.

The management use: team meetings to discuss cases, field visits and analysis quality control and complaints registration.

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## **1. INTRODUCTION**

The quantity and quality of surveying work is very important for the Netherlands Cadastre, Land Registry and Mapping Agency (in short: Kadaster). As well as a good contact with customers. That's why we invest constantly in innovation. The result of the innovation is that in recent years, a lot has changed in the land surveying process in the Netherlands.

Measuring with GPS has become the standard. The measuring portfolio was exchanged for a tablet. Then it was possible to make digital sketches. The new tools also make it possible to process measured data into a cadastral map from the surveyor's home.

In the past surveyors worked in a group with two or three men. That was necessary because they used different instruments. The new tools make it possible for the surveyor to measure solo. At this moment there is no need for assistance anymore.

Customers are increasingly demanding and we want a good way to respond to it. So the surveyor must be aware of the importance of responding flexibly within the framework of the guidelines to customers questions.

As a consequence the land surveyor obtains less skills and experiences in the art of measuring and has less regular contact with colleagues for peer review. That's why management decided to invest in training all 250 surveyors working for Kadaster.

We call the training "situation depending measuring". This name refers to the land surveyor who must consider at each measurement: 1. The necessary tools he uses, 2. Taking into account the situation in the field and 3. Taking into account of the Kadaster guidelines.

### **1.2 Structure of the paper**

In chapter 2 there is an introduction about the Surveying department. Chapter 3 explains the purpose of the training, the components and why we chose for workshops and not for training. Chapter 4 gives notes to the way we develop the workshops and how we test them. In chapter 5 we inform about the results and the management control at the end of the workshops and chapter 6 informs about the lessons learned and conclusions.

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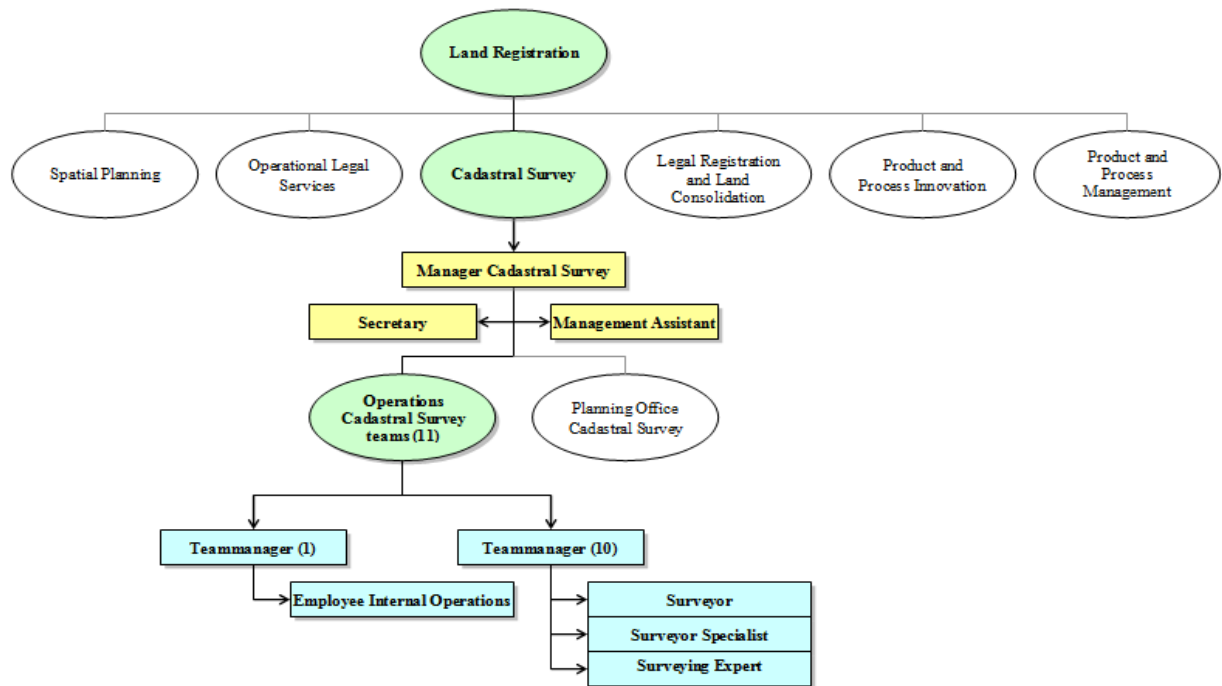
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## 2. DEPARTMENT OF LAND REGISTRATION



The department of Land Registration records property data and data on ships and aircraft in the Public Registers and the Key Register Cadastre. In these Public Registers archives the Land Registry also various notarial deeds about real rights and mortgages. Over 800 people are working for this department.

### 2.1 Department Cadastral Survey

The department Cadastral Surveying performs the surveying of Kadaster and take care of the maintenance of the cadastral map.

As told in the introduction there is a lot of innovation in this department. Innovation in combination with carrying out the surveying process with operational excellence, customer focus, and sufficient quality ask for adequately equipped surveyors. That's why we invest in professionalism of our employees (live long learning). And that's why, when necessary, we attract and train new surveyors or outsource work to engineering firms .

### 2.2. The organisation of department Cadastral Survey

The department Cadastral Survey has two divisions. One Planning Office Cadastral Survey in Apeldoorn. And eleven Operational Cadastral Survey teams on locations in Rotterdam, Amsterdam, Arnhem, Eindhoven, Zwolle and Groningen.

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The local Operational Cadastral Survey teams have the following employees:

- A team manager for supervising the team and monitoring the results
- About twenty surveyors who are responsible to visualise the new boundary, surveying and processing.
- About four specialists who are responsible for reconstruction boundaries for major construction projects and when there is a disagreement on boundary between neighbours.
- A surveying expert who is assisting the team manager in coaching the surveyors in (the quality of) their work.

And there is one team with Employees Internal Operations. They are responsible for the control of the processing of outsourced work and they do the processing for organizations (such as municipalities and provinces) that provide measurement data.



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### **3. THE TRAINING**

As told in the introduction there are many changes in the surveying work. After every change in the working process there was a training. For example we offered a training to measure and work on your own 'solo' with the GPS. We also offered a training on how to use the tablet. Part of the training was the ergonomic aspect. Such as how to carry your tools when you are solo in the field, how to hold the tablet and GPS while working and how to work safely when you are alone. All these courses were related to new tools and methodologies in a particular part of the work process.

That's why management decided to invest in training for Surveyors, Surveyor Specialists and Employees Internal Operations. There was also a training for Team managers and Surveyor Experts. And there was a short training for companies who do surveying work in our assignment and for organizations and companies that provide measurement data.

#### **3.1. Purpose of all the training**

With the training we tried to achieve that, within the cadastral gathering process, the surveyors will measure:

1. according to the regulations
2. effectively with all available tools
3. with the relevant points (not too much and no too less).

There is not one solution because every situation is different. And the modern tools make this possible as well as the rules. The surveyors will learn to measure situation dependently.

#### **3.2. Workshops instead of training**

Because we wanted to have an interactive setting to raise the awareness of the surveyors, we chose to have workshops instead of classroom trainings.

The subjects of the workshops followed the regular working process for surveyors:

- Preparation of the fieldwork (with customers) and visualise the boundary
- Surveying of the parcel(s)
- Processing the cadastral map
- Archiving the fieldwork

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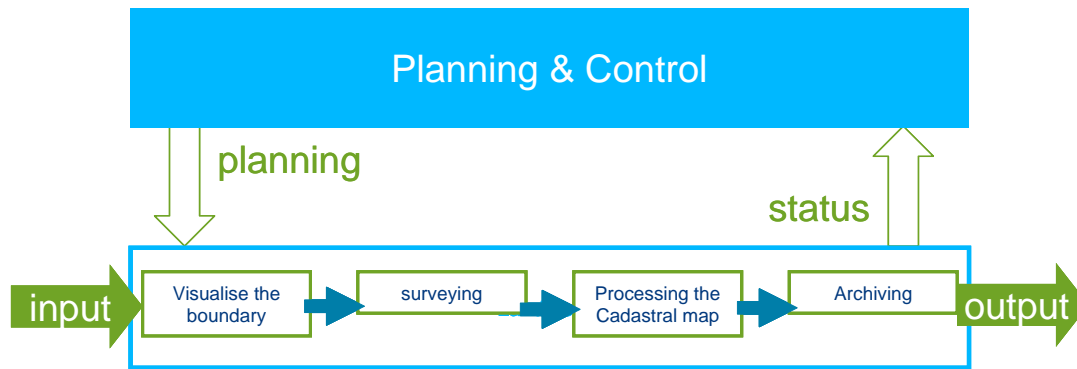
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By following the work process the workshops are closely linked to the daily practice of the surveyor. This will contribute to the purpose of the training.

### 3.3. Workshops for surveyors

The components of the training for the 250 surveyors, surveyor specialists and employees internal operations are derived from the above mentioned purposes.

#### 3.3.1. Background and purpose of the training (1 hour)

The teammanager explains the background of the entire program (1 hour). All the changes that have taken place in the domain of surveying, the changes which in the short term are expected and the relationship with other processes outside the surveying domain.

#### 3.3.2. Visualise the new boundary (5 hours)

Often the surveyor is seen as the representative from Kadaster. So uniformity is very important. The subject of this workshop is to highlight the importance of quality and uniformity in how to visualise the new boundary for securing legal certainty. And the importance of good customer contact.

#### 3.3.3 Surveying (6 hours)

In this workshop the object is efficient surveying of a border with modern tools and uniform style of measuring. And the importance of a good cadastral survey so that the purpose of the survey is met: 1. registrate the border in the Public Registers and 2. if necessary the possibility to reconstruct the border. This reconstruction is important for major construction projects and when there is a disagreement on boundary between neighbours.

#### 3.3.4 Processing (4 hours)

When updating the digital cadastral map the surveyor uses the connection points from the survey. In this workshop they discuss of how many connection points are needed for processing the survey in a responsible manner in the cadastral map.

### **3.4 Workshops for team managers.**

The workshop for the team managers (4 hours) focused on engagement and understanding of the importance of the workshops. Conducting the workshops is a big investment and we expected a positive influence at the work of the surveyors. This workshop prepared the team managers for their own presentation of the background and purpose in the workshops and their responsibility after the workshops with monitoring and evaluating the results.

### **3.5 Workshop for surveying experts**

In the workshops for the surveying experts (3 hours) we talked about their responsibility for monitoring and evaluation after the workshops. For instance: analysis of complaints and quality controls on use of the rules. That information is to be used for team meetings in which case studies are discussed by the surveyors. And also for coaching the surveyors in their work.

### **3.6 Workshop companies and organizations providing measurement data**

The products from the companies who do work for us must of course be in line with the quality requirements of Kadaster. That's why there was for each sourcing company one day a summary of the workshops for cadastre employees. We also offer this workshop to organizations providing measurement data.

### **3.7 Trainers**

The workshops are given on the location where the surveyors normally work. Each workshop is facilitated by a trainer and a local surveying expert.

Our trainers are surveyors who are also teachers in addition to their regular job. They are trained for their role as a teacher. The local surveying experts support the trainer during the workshop with local information. They know the local employees and advise the trainer in working with the teams.

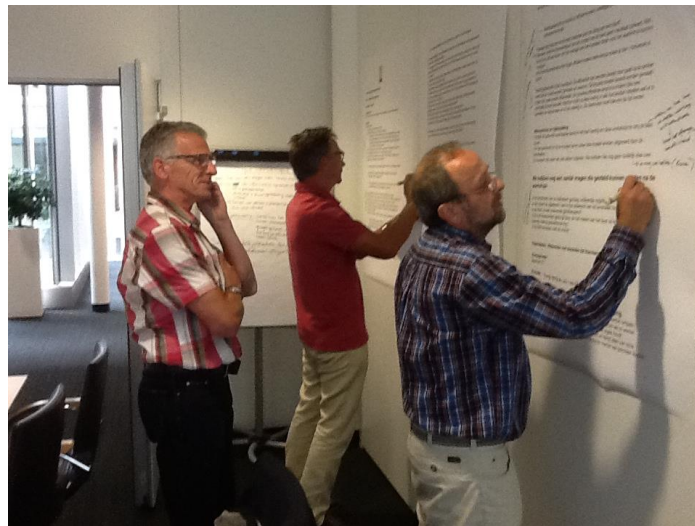


#### 4. THE DEVELOPING PROCESS

The developers of the workshops all work in the surveying process, but with different tasks: surveyors, surveying experts, process managers and a team manager. They were supported by a core team with a project leader, a senior process manager cadastral surveying and a human resources and development advisor.

The task for the developers was:

- To create a presentation with active teaching methods, including the preparation of cases from the past
- To create an instruction for the workshops facilitators
- To include the workshops facilitators for the development of the workshops.



The developers were divided into groups for each of the workshop topics: visualise the new boundary, measuring and processing. By doing that we could develop the different workshops simultaneously. Advantage: saving time. The workshops facilitators were involved in the early stages so they were able to get to know the content of the workshop and to tell their ideas for the workshop.

##### 4.1 Time schedule

The time investment for the development team and workshop facilitators for developing and implementation was approximately 270 hours per person.

In september/october 2013 the development team started. In four half-day sessions, a concept workshop plan for the all the workshops was created. In between the developers worked on the preparation of the presentations and cases for the workshops. The cases were based on old cases with clear indicators how the working process could be improved. By using actual cases we want to increase the participation during the workshop.

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The workshops were given in the local offices to groups of approximately 12 surveyors each group. In december 2013 we started with the first workshop: background and purpose of the training and visualise the new boundary (about 20 times on location). In january 2014 we started with the workshop measuring (about 20 times on location) and in february 2014 we started with the workshop processing (also about 20 times on location).

#### **4.2 Testing the workshops**

There were two test moments:

1. Each workshop was presented by the development teams to the core team and facilitators of the workshop. During these test the participants could give their ideas and recommendations.
2. Each workshop was tested with a pilot group of surveyors. A group from the location Arnhem was the pilot group. After that test the workshops for the rest of the surveyors started. This testing was an opportunity to test the effectiveness of the content and seeing if the workshop contributed to the desired result for the surveyors.

For each workshop there were a few sheets with information and explanations. For the rest there were case histories and interactive components tot increase the participation. These sheets were the guide for the facilitators of workshop. Besides the sheets there was also an instruction for the workshop facilitators. For one workshop there was a homework assignment before the start of the workshop.

## 5. RESULTS AND MONITORING AFTER THE WORKSHOPS

The workshops were well received by the surveyors. They have become more aware of the opportunities of the current resources within their field of work. During the workshops there were good discussions on the cases. The involvement of the local managers and the surveying experts was a good contribution to the success of this way of training.

### 5.1 Management control

One of the critical success factors is the monitoring and evaluation by local managers and surveying experts after finishing the workshops. They monitor if the purpose of the workshops to raise awareness amongst surveyors is met. And if the current resources are used effectively and how to determine the relevant measurement points. And how to interpret the regulations with all the changes.

That's why the core team advises the team managers with a number of ideas:

1. Case histories  
Analysis of complaints and quality controls on use of the rules by the surveyor experts. With that information the manager can organise team meetings in which case studies are discussed by the surveyors.
2. Field visits  
Where possible organize (more) field visits in which during the day there is time to discuss the actions of the surveyor with an open mind. When there are effective measurements than discuss them afterwards in team meetings (attention for what goes well).
3. Quality control  
Periodical quality control and analyze complaints registration. A complaint can be the result of not working according to the regulations. Then give feedback to the surveyor.
4. Evaluation  
Evaluate after a year the results of the workshops and results of local actions as mentioned above.  
In the fall of 2014 each surveyor had to make a small test. The results of these tests are now (march 2015) analysed. Based on that analysis each team will be visited with a small presentation and some cases around the most common mistakes. And also in the regular control of data there is a discussion with the surveyor about mistakes and why he chose for a certain solution.

## **6. LESSONS LEARNED AND OVERALL CONCLUSION**

The core team evaluated this process with all developers and workshop facilitators. Purpose: hold on the good things and learn from mistakes for future (development) projects.

### **6.1 Developing the workshops**

The developing of the workshops takes a lot of time because there were every time new ideas. The teamwork between the developers and facilitators of the workshops takes much time. The first workshop got too much attention and the coherence between the different workshops could be better. Testing the workshops with a group of surveyors was very good. The workshop facilitators appreciated the involvement of the managers and the core team.

### **6.2 Giving the workshops**

Not all teams were balanced, a good mix of expected positive or negative attitude, young and old, more and less experienced is important. Positive was that a manager was present at each workshop.

The name “workshop” instead of “training” was good. Pay attention that in future there should be even more active participation from the surveyors.

The explanation for the facilitators was good, understandable. The order of the topics was not always logical because some cases does not follow well the surveying process. It is pleasant to prepare and give a workshop with two people. The mix with a trainer (from another location) and a surveyor expert, who knows the location (and participants), is recommended.

### **6.3 Involvement management**

The support and commitment from the management was perfect. The employees were well informed by management. On some locations the facilitators consulted the managers for or after the workshops. Than they discussed about the participation and how they will be able to connect. Managers check on handing in the homework for the assignments.

The presentation of the background and purpose by the manager was not well received on every location. Next time take more time on preparing the presentation wilt all the team managers.

### **6.4 Communication**

There was uncertainty in advance about resistance from the employees: “a training again, we have had a lot of training last years, let’s just do our job”. In practice there was only little resistance thanks to the involvement of the management. The invitation e-mail for the workshops has been well received and the answers afterwards on questions were appreciated. Next time the agenda needs to be send in advance.

### **6.5 The project**

It was pleasant to share the ideas and the possibility to change the workshops accordingly. That’s why the workshops are well tailored to the surveying process and to the group of experienced employees. The idea to test every workshop was perfect.

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The support of the core team was very good. Next time there should be more attention to the time investment. The project costs more time for everyone than was estimated in advance. Most of the time was for the facilitators to prepare their workshops.

The meetings to develop and later on the presentation of the workshops for the core team were meaningful and there was a fine atmosphere in the group. In General, this is a good concept. Also, it is good that the management has been actively involved from the beginning.

### **6.6 Monitoring after the workshop**

To practice the workshop issues on every location it's necessary that managers and surveyor experts talk about the advice of the core team (Chapter 5) and work it out with each other.

### **6.7 Overall conclusion**

From quality reports it appeared that there was not always measured in accordance with the regulations. And research showed that sometimes too much or too little measurement points were included. So we concluded that the training in the past have not yet led to the desired effect.

That's why management decided to start a training where we focused on a process of awareness of how to use modern tools effectively, how to determine *relevant* points of measuring and how to interprets regulations with the modern tools and methodologies. The workshops where well received by the surveyors. The result of the workshops was more awareness of the opportunities of the current resources within their field of work.

After this training the management started with monitoring on the results. This is very important: check whether the surveyors practice the things they learned in the workshops.

## REFERENCES

Principal for these workshops: Wim Boschman, manager Cadastral Survey  
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Email: [Wim.Boschman@Kadaster.nl](mailto:Wim.Boschman@Kadaster.nl).

## BIOGRAPHICAL NOTES

Emma Meeuwsen

As a member of projects, Mrs Emma Meeuwsen was involved in several Cadastre GEO training and development programs. For instance the transition to one-man surveyor teams, a training for border reconstruction with assessments, a two years training program with assessments for new surveyors, the transition to mobile working with the Tablet PC and last year workshops for an efficient way of work with modern means. In that last project there is developed a train the trainer program and materials for regional training.

Klaas van der Hoek

Mr Klaas van der Hoek is a Senior Advisor for Land Registration at the Head Office of Kadaster for the products and the processes of the Cadastral Map and surveying. He is Responsible for the database of the Key Register Addresses and Buildings (BAG). During his career he was responsible for the cadastral reconstruction in the Netherlands.

As expert in mapping processes and quality assurance, Mr Van der Hoek has worked in several international projects. In the international context he was responsible for the strategy plan and development of procedures for Land Registration and maintenance of registration in Rwanda

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