

Coding and System 500

Many surveyors have different opinions and ideas on the subject of coding – what codelist to use, how to code features in the field, how to import the data into the CAD package....

However, what is agreed by all surveyors, is that the coding in the field must be as efficient as possible to not only minimise survey time, but also to minimise time spent in the office producing the final plot.

And of course, the aim of any survey is to ultimately produce the final plot of the survey showing all features correctly and accurately reproduced.

It is for this reason that coding with System 500 is extremely flexible. It allows surveyors to work how they wish to work in the field.

Additionally, the flexibility of the output of data from SKI-Pro (or the sensor) particularly with **Format Files** allows the coded survey data to be imported into most CAD packages.

Coding Types

Two types of coding are supported by System 500 – **thematical coding** and **free coding**.

Generally, thematical coding is more commonly used and perhaps initially easier to understand, whereas free coding is less used, but is more flexible and perhaps more powerful. The differences are described below.

Thematical Coding

Thematical coding should be considered as **point related** coding.

Basically, each surveyed point can be stored into the database with a code assigned

to it - this code is “physically attached” to the point.

Only one code can be assigned to one point.

Free coding

Consider free coding as **time related** coding.

Surveyed points are not assigned codes in the same way as thematical coding – the code is not “physically attached” to the point. A code only relates to a point due to the chronological order in when a point was surveyed and stored and when a free code was chosen and stored.

When this data is exported (and it **must** be sorted by time in order to retain the chronological sequence of points and free codes) and then imported into a CAD package, the CAD package will assign the codes to points simply due to the fact that a code is recorded chronologically immediately before (or after) a point.

Codelist Features

Most System 500 surveyors create their codelists in SKI-Pro and then use these codelists on the sensor in the field.

Codelists can be as simple or as powerful as the user requires. However, there are some nice features which can be built into the codelist, which as will be described, can really help the surveyor in the field.

Note, the features described below within the codelists apply to both free and thematical codelists. It is only the use of free and thematical codelists in the field and the exporting of free and thematically coded data which is different.

Layers

A layer could also be called a “code group” and as described below can have more than one

use. Typical layers could be **Vegetation** (for features such as trees, bushes etc), **Roads** (for features such as centre lines, curbs, catch basins, etc).

Most CAD packages handle layers in a similar manner allowing different layers to be assigned different line styles or colours, or layers can be turned on or off (allowing layers to be viewed or hidden).

Even if a CAD package does not use layers, or a user does not want to use layers within the CAD package, assigning groups of codes to different layers can still help the surveyor in the field. As described later this may help a surveyor in the field.

Note when creating a codelist within SKI-Pro, even if a user does not wish to use layers, one layer **must** be created before codes can be created.

Codes

The codes themselves are of course the “flag” that indicates to the CAD package that a surveyed point is a tree or a road centre line etc. The CAD package then assigns the appropriate symbol or line style to this point.

Obviously, the codes that are used within a codelist depend on the codes that are being used in the CAD package. For example, in the standard code tables in LISCAD, a tree could be coded as **tr** or even as the number **201**. It does not matter what code is actually assigned to a feature – but it is important that the CAD package correctly interprets this code.

When codes are created in SKI-Pro, it is then possible to specify the **code type** for each code. The code will be of type **point** for thematical coding or of type **free** for free coding.

Within System 500, it is also possible to assign a **Code Description** to codes. This could be very useful when using a codelist with a large number of codes or when numbers are used to represent codes, or if a new surveyor joins a company and is not familiar with the codelist.

Simply give each code a meaningful code description – this description can then be viewed in the field along with the code when surveying points in the field.

Attributes

Attributes belong to individual codes. Assigning attributes to codes allows additional information to be recorded about the point to be surveyed. (Note, some people use the words, “info blocks” instead of attributes – particularly in relation to free codes. An info block can be considered to be identical to an attribute).

For example, a point could simply be coded as a tree, but using attributes would allow the condition, the species, and the height of the tree to additionally be recorded.

Attributes have **names** – an **attribute name** is given to the attribute when the attribute is created. In the field during the survey, attributes are then given **values** – **attribute values**. For example, an attribute name could be **Species** and the attribute value could be **Pine**.

When creating the attributes for codes within a codelist in SKI-Pro, try to use the many useful properties that attributes can have.

- **Attribute types** – attributes attached to codes can be of type **fixed**, **mandatory** or **normal**.

A **fixed attribute** means that this attribute will always take

the default value assigned to this attribute. The user cannot edit this value in the field.

A **mandatory attribute** means that when this code is used in the field, the user **must** enter an attribute value before the point can be stored.

A **normal attribute** is simply not mandatory or fixed!

- **Value types** – attributes attached to codes can be of value type **integer**, **real** or **text**.

The meaning of this is clear and can prevent simple mistakes being made in the field. For example, if it is required to enter the width of a tree being surveyed, then the attribute **Width** could be assigned the value type **real** which ensure only a numerical value can be entered for this attribute.

- **Value region** – all attribute types (integer, real or text) can, if required, be assigned a **choice list** of attribute value. In the field, the user can then select the attribute value from this choice list. Alternatively, attributes of type real and integer can be assigned a **range** of values. Then in the field, the user must enter an attribute value within this range.

- **Default value** – all attributes can be assigned a default value. This means that when the attribute is used, the default value is presented – this can be useful if the user mostly enters the same attribute value for a particular attribute. Of course, the default value can still be changed.

An Example...

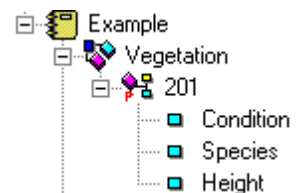
We have been asked to survey a plantation area where many new trees have been planted. The client has asked us to collect the following information about the trees:

- The **Condition**: Either **living** or **dead**. Since we have been asked to only surveying living trees, this can be fixed to living. Thus the attribute **Condition** is **fixed** to the value **living**.
- The **Species**: The trees are a mix of **pine**, **fir**, **ash** and some **others**, but mostly **pine**. Thus the attribute **Species** is a **text choice list** containing the choices **pine**, **fir**, **ash** and **other**, but with the default being **pine**.
- The **Height**: The client wants trees only between **0.5m** and **2.0m** tall to be surveyed. Thus the attribute **height** is a **range** allowing **real** values to be entered between 0.5 and 2.0.

Our Codelist

Our CAD package interprets a point coded with the code **201** to be a tree – this code is assigned to the **vegetation** layer as shown here.

The attributes we assign to this code use the features just described and as shown below.



Attribute **Condition** – fixed text attribute – default value **Living**.

	Attribute Name	Attribute Type	Value Type	Value Region	Attribute Values	Default Value
<input checked="" type="checkbox"/>	Condition	Fixed	Text	None	...	Living
<input checked="" type="checkbox"/>	Species	Mandatory	Text	Choice List	...	Pine
<input checked="" type="checkbox"/>	Height	Mandatory	Real	Range	...	None
<input type="checkbox"/>					...	

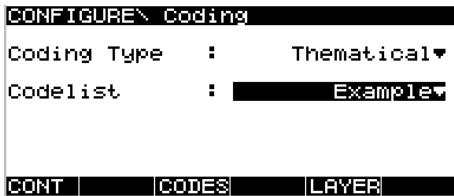
- Attribute **Species** – mandatory text attribute using a choice list. Default value is **Pine**.
- Attribute **Height** – mandatory real attribute with a range limit between 0 and 2. No default value.

Using Codes in the Field

Once the codelist is transferred to the sensor and selected to be used in the configuration set, points can be surveyed with codes.

Remember, it is in the same panel where the codelist is selected to be used that it is chosen if thematical or free coding is to be used.

Also in this panel, **F3(CODES)** allows the codes to be viewed and **F5(LAYER)** allows the individual layers to be turned on or off. This may help a surveyor if the full codelist contains hundreds of codes and he wishes to only use codes in specific layers for a particular survey.

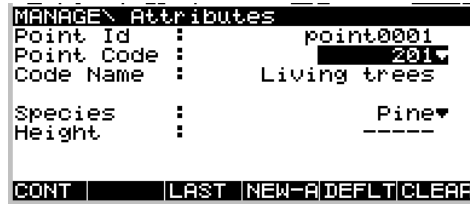


Using a codelist in the field is a straightforward procedure for both free coding and thematical coding. Remember with free coding, more than one code can be stored “in between” surveying points. This then allows that operation codes (for example in LISCAD) to be used where “multiple” code entry is needed.

Thematical coding however means that only one code can be stored with one point – which as described earlier is the whole philosophy of thematical coding.

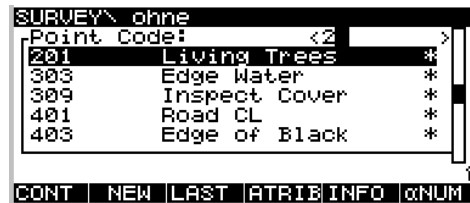
When choosing the code (free or thematical) it is always pos-

sible to see the code description – this is why it is useful to use meaningful code descriptions.



Also remember to always use the “search facility” when choosing a code – this is particularly useful with large codelists.

Highlight the **Code** line (or **Free Code** line if free coding) and then press the first character of the code you wish to use. This then opens the code list box



panel, revealing all codes and places the focus on the code that begins with this letter. The correct code can then be selected with **F1(CONT)**.

It is worth describing other functionality and features in the code list box.

- **F2(NEW)** allows new codes to be added to the code list (including attributes if needed).
- **F3(LAST)** displays a list of the 5 last used codes. If a code is then chosen from this list of last used codes, the attribute values for the attributes of this code are also recalled.
- **F4(ATTRIB)** allows attributes to be entered for this code (described below).
- **F5(INFO)** toggles between displaying the layer to which the code belongs and the code description.

Note also, the asterisk in the code list panel on the right hand side indicates if that code has

attributes belonging to that code.

Using Attributes in the Field

F4(ATTRIB) in the code list panel accesses the **MANAGE\ Attributes** panel. This panel allows the entry of attribute values for the attributes attached to this code.

There are some rules as to the attribute values that are displayed in this panel.

1. The selected code was not used for the previously surveyed point. In this case, any displayed attribute values are the default attribute values for this code.
2. The selected code was used for the previous point and attribute values were changed for that point. In this case, the changed attribute values are displayed for this point now being surveyed.
3. The code was selected using **F3(LAST)**. In this case, the attribute values displayed are those that were used when the code was last used. This is particularly useful when “stringing” points allowing the last used string values to be recalled.

Additionally, **F6(CLEAR)** clears all default values and **F5(DEFLT)** recalls default attribute values (if the attributes were assigned default values).

F4(NEW-A) allows new or additional attributes to be added to that code. An attribute name (entered on the left hand side of the panel) can be entered and if required, a default attribute value (entered on the left hand side of the panel) can be entered for that attribute. Note, all new attributes created this way are of type **text** and **normal** (see above).

Using Our Codelist

Using the codelist we have created for our tree survey, it becomes clear how the “features” we have built into this codelist help the surveyor in the field.

```
MANAGE\ Attributes
Point Id      :      point0001
Point Code   :      201
Code Name    :      Living trees
Species      :      Pine
Height       :      -----
CONT | LAST | NEW-A | DEFLT | CLEAR
```

Attribute **Condition** – fixed attribute of value **living** and is therefore not displayed. The surveyor is not confused by seeing unnecessary information.

Attribute **Species** – mandatory text attribute with a choice list. The choice list is now displayed as a list box allowing the user to choose the correct

value. Because this attribute is mandatory, it is not possible to store the point unless an attribute value has been entered.

Attribute **Height** – mandatory real attribute with only a range of permitted values. The user must enter a value and additionally this value must be within the specified range.

Using “well constructed” codelists, it has been shown how the codelist can help the user to ensure all necessary information is collected.

The user in the field is guided as to what data should be collected and using choice lists and ranges, it can be ensured that only the correct and required data is surveyed.

Remember...

- The flexibility of System 500 allows codelists to be designed

suitable for most surveys and CAD packages.

- Free coding is time related coding, thematical coding is point related coding.
- Create codelists with features that will help the surveyor in the field.
- Use the full functionality of the attributes – use mandatory and fixed attributes, use text, real and integer attribute types with choice lists and ranges
- Use the **F3(LAST)** key to recall the last use codes – this especially helps when stringing codes.
- New codes and attributes can be created in the field at any time.