

At the NKG presidium meeting in Akranes, I was asked to meet with members from the Height Determination Group to try to come to solutions about the foreseen levelling problem along the border between Finland/Sweden and Norway. The meeting was held in Copenhagen 28 October 1999.

Minutes of meeting in Copenhagen, 28 October 1999

Present:

- Jean-Marie Becker, Chairman of Height Determination Group
- Per Ola Eriksson, LMV Sverige
- Jussi Kääriäinen, FGI Finland
- Olav Vestøl, SKV Norge
- Sigvard Stampe Villadsen, KMS Danmark
- Casper Jepsen, KMS Danmark

The meeting was initiated by the presidium of NKG, represented by Stampe Villadsen in order together with members from the Working Group on Height Determination to work out foreseen problems in a common final realisation of the nordic levelling projects. Three problems were handled on the meeting:

- The Øresund connection
- Levelling plans in Norway, Sweden and Finland along the border lines, with connection to the mareographs
- Preparation of data for a common nordic adjustment.

The Øresund connection:

Jean-Marie Becker has send a proposal to the Working Group on Height Determination about levelling across the new Øresund tunnel/bridge. The proposal was discussed, and the group agreed that the connection should be levelled before the bridge was opened for normal traffic (June/July 2000). Levelling will be done mainly and preferably with motorized geometric levelling (Tandem levelling was put as an idea). Trigonometric levelling is probable solution for the mid part/hanging part of the bridge.- The Danish side (Casper and (Stampe)) has the responsibility for reconnaissance of levelling bench marks, and the preliminary negotiations with the Danish Road Directorate. Per Ola is responsible for for negotiations with the Swedish Road Directorate. All details in the work plans are exchanged directly between Per Ola and Casper. Probably time schedule is March/April 2000.

Levelling Plans:

Levelling done in the last 2 years and plans for the future work was run through for Finland, Norway and Finland. Most interest was taken to the Norwegian plans, according to the plans and funds for the work, the levelling could not be finished before 2005, 2 years later than expected and agreed in the NKG meeting in Gävle. Although the Norwegian plans was delayed, it was possible with minor change of levelling routes, to take hand of the common nordic levelling lines from Trondheim to the norther-nmost part of Norway with connection to the mareographs, and proper treatment of the closure along the border to both Finland and Sweden, within the given or expected given funds. In addition it was possible to level at least one line from the Oslo area to the westcoast of Norway, a line that make conection to all the mareographs in southern Norway. All the levelling mentioned above could be done within the timeframe 2003. The lines that has to be levelled until 2005 would then be 2 lines from the Oslo area to the western part of Norway lines that also connects to the mareographs, and close the loops in the southern Norway.

In total the group agreed upon the following:

All levelling lines in Norway north of Trondheim can with the given and expected given funds be levelled within 3 production years.

Norway will adjust the plans for the northernmost area and measure from Kivilompolo to Karasjok and from Njuorggan to Vardø instead of measure from Karasjok to Honningsvåg. A new line from Mo in Rana to Sandnessøen instead of a line along the coast north of Mo in Rana. A wish for a levelling line from Masskog south of Overhalla has to be considered. (Possibility for closing already measured line) Olav will send revised plans for the future levelling. Finland will have to look for plans to measure the line from Utsjok to Njuorggan.

Sweden should measure the line from the border at Umbukta and south to the levelling line near Hemavan.

The group discussed too the possibility to speed up the levelling process by including in first hand Swedish, secondary Danish levelling teams instead of hiring levelling help inside Norway. These specialized teams has a very high daily production rate. Olav promised to have it in mind.

Preparation of data for a common nordic adjustment:

Denmark has in the NKG assembly in Gävle promised the use of the Danish database and adjustment system for a nordic adjustment of the nordic levelling block. The promise is there still, but there is a need to get the project started, and a need to know if and when this project will run. The

reason is, that resources has to be allocated for the project. Sweden will try to send raw data to Denmark to see how the database works, to modify reading procedures to the database and the adjustment system, and to try to see if the system is able to find errors, or weak parts in the observations.

In total a good and fruitfull meeting in Copenhagen.

Stampe

NB: Map of the proposed levelling lines is not ready before a month from now