



Branschsamverkan i Grunden

# VIP- möte 2016

## Branschsamverkan | Grunden

Changes of properties by dynamic measurements

**Better:**

Identification of Changes of soil properties and bearing behaviour by interpretation of dynamic measurements

Jan Laue (LTU) Projektledare

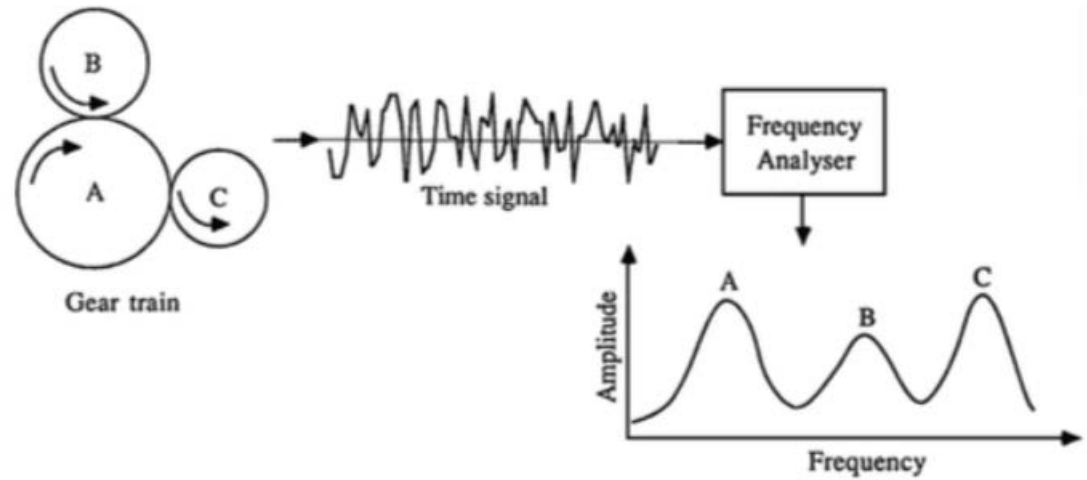


# Projektets mål

*Make use of existing dynamic measurements (e.g. used for rail conditions) to identify the subsoil along a track*

*Enlarge the scope of this measurements to long term and potentially short term changes in the ground behaviour*

# Projektets mål



e.g. analysis of the accelerations of the bearings

# Example from pre study

Using the deflection measurements to identify potential areas of peat areas in a former river side basin

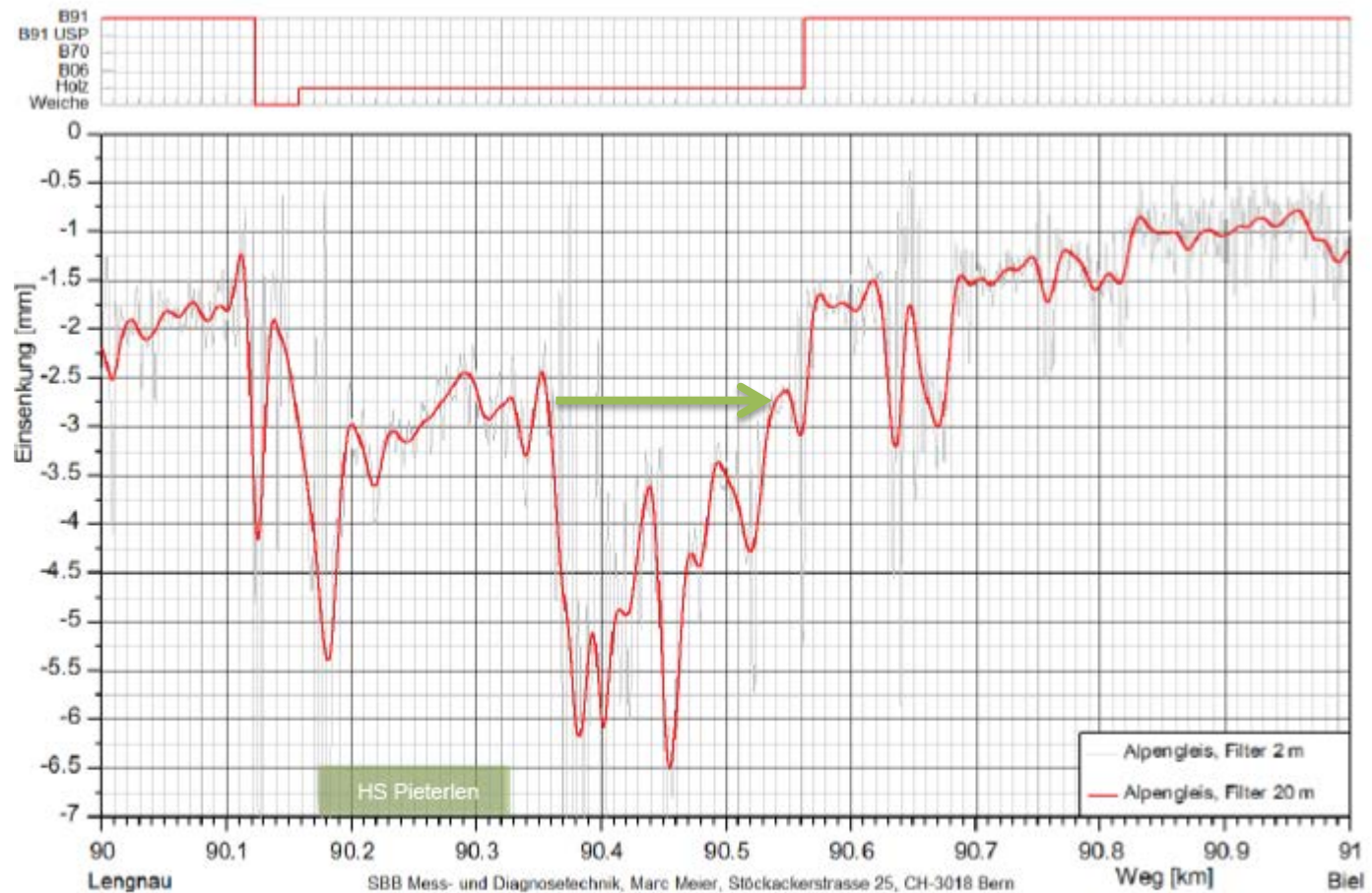


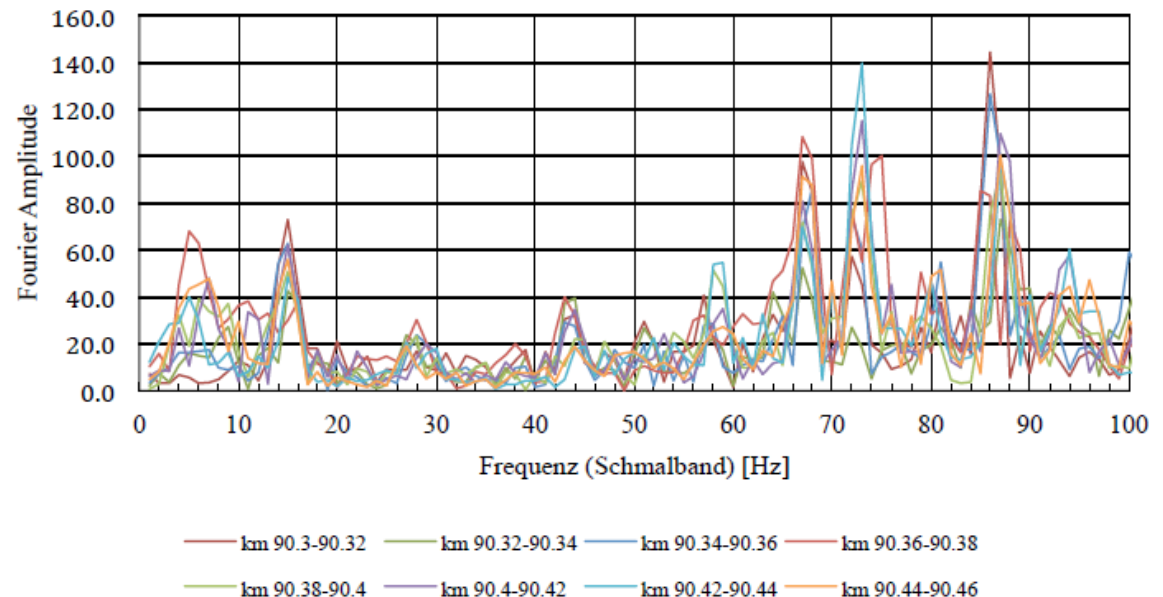
Abbildung 23 Einsenkungsmessung: Pieterlen - Biel, km 90.00 - 91.00, Alpengleis<sup>90</sup>

# Example from pre study

15Hz: Layer of peat

5Hz: maximum extension of peat layer which correlates with the vertical deflection measurement

Messfahrt 2402: Pieterlen - Biel km 90.30 - 90.46 Zusammenfassung - Schmalband



# Projektet organisation

*Start of the project involving Alexandru Marin as potential post doc working in the project.*

*Unfortunately decided in June not to join the group in Luleå*

*Thus opened a position for PhD student (closed end of September (41 applicants)*

*PhD Student (NN)*

*Erik Eriksson (TrV Luleå)*

*JVC (Iman ArastehKhouy, NN)*

# Tidplan

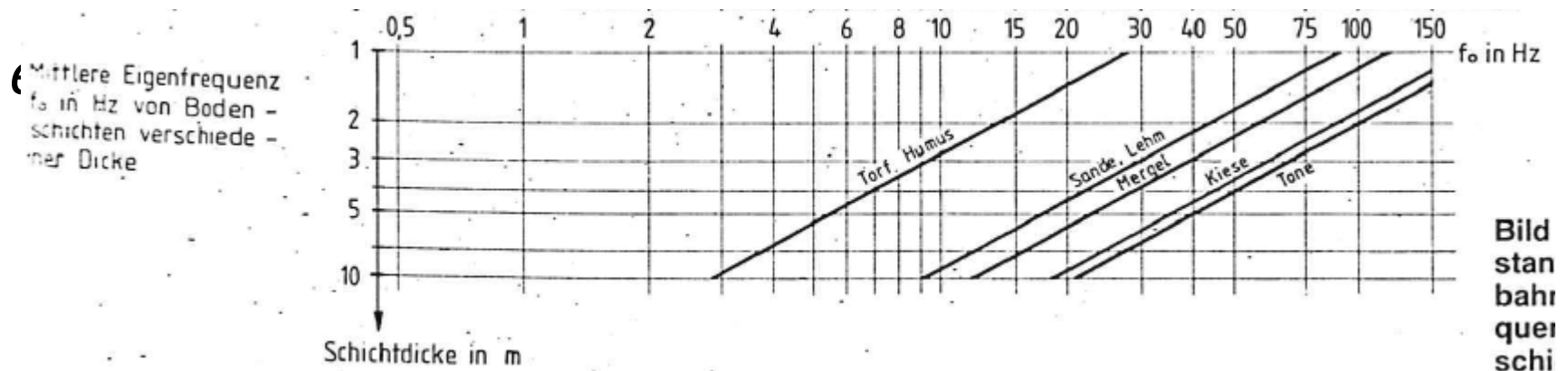
*Caused by the change in person there is delay of appr. Half a year*

Aktivitet	för aktiviteten	resultatet av aktivitet	(datum)	Q1+Q2	Q3+Q4
1) Literaturstudy	Achieving state of the art	Report on summary of SoA	2016-12-31	Ja	Ja
2) Site determination and investigation	Collecting and interpreting existing data	Presentation. Report on existing site including outlook for task 2a	2017-09-30	Nej	Ja
2a) Gaining of new data for specific site	Establishing new data needed for detailed	Interim report or presentation for new data, Final report on measurement site	0.09.2018 / 31.3.2018	Nej	Nej
3) Detailed analysis of site in laboratory	Quantification of necessary soil parameters for numerical analysis and data interpretation	Report on soil behaviour and properties, presentation to stakeholders	2018-12-31	Nej	Ja
		Report / Publication of modelling			

# Beskrivning och resultat

*But:*

*Literature review proceeds well, e.g.:*



(after Braune, 1991)

$$f = \frac{v_s}{4H}$$

$$G = v_T^2 \cdot \rho$$



# Beskrivning och resultat

*First random data from Sweden analysed*

*Critical points:*

*Allocation of time and place, meta data to identify velocity given frequencies as well as train given frequencies*

*Cut off frequencies, data treatment and storage, sensors, low frequencies needed*

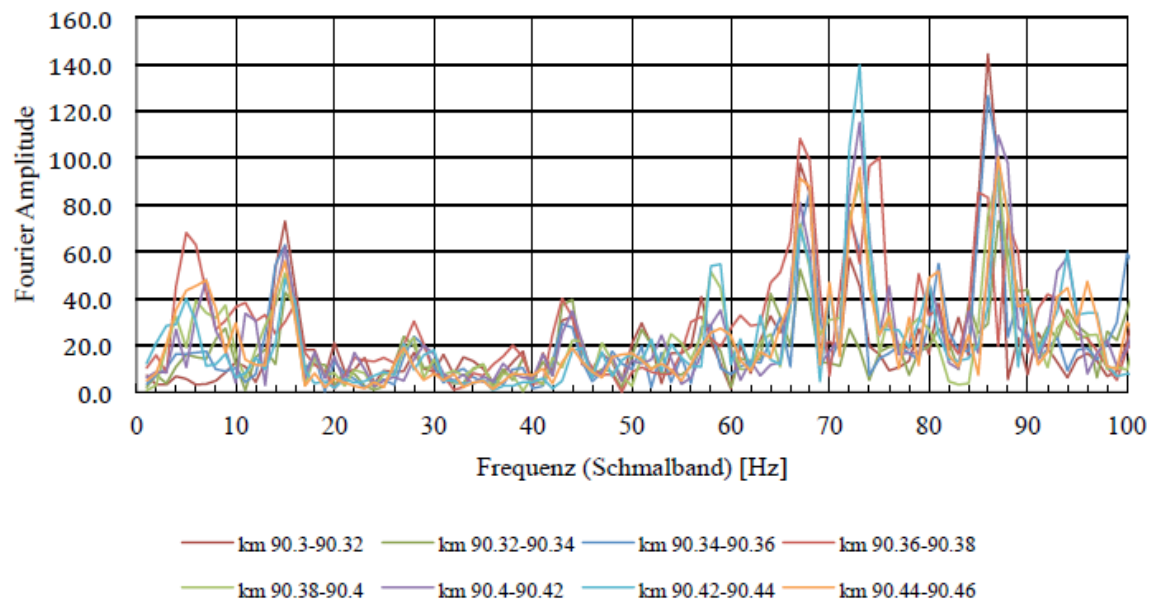
# Next Steps

- Employ student
- Define together with Eric and JVC the sample sites
- Arrange to get original data from this sites
- Continue to analyse measurements from various sites to get familiar with the various overlaying aspects of the measurements
  
- E.g. Which type of frequencies, random and systematic scatter ...

# Next Steps

- Which type of frequencies, random and systematic scatter ...

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# Next Steps

Equip a train at various positions (first, middle, last car) to identify changes during passing

