Project standard

Piezo resistive (PR) pore pressures

Our reference
www.geffiles.org

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1 Piezo Resistive: PR

This type of pore pressure transducers is more suitable for automatic monitoring, since it does not involve human interaction.

1.1 Compulsory keywords

```
#GEFID = 1,0,0
#COLUMN = 3
#COLUMNINFO = 1, days, time, 1001
#COLUMNINFO = 2, kPa, pressure, 1002
#COLUMNINFO = 3, mWk, head, 2001
#FILEDATE = yyyy, mm, dd
#PROJECTID = Name of the project
#FILEOWNER = Creator of the file
#EOH=
```

1.2 Compulsory keywords for this standard.

```
#PROCEDURECODE = GEF-PR-Measurement, 1, 0, 0, pr100.pdf
#MEASUREMENTCODE = GEF-PR-Measurement, 1, 0, 0, pr100.pdf
#COMPANYID = company name, VAT number, country dial code
#COLUMNMINMAX = 1, minimum void 1, maximum void 1
#COLUMNMINMAX = 2, minimum void 2, maximum void 2
#COLUMNMINMAX = 3, minimum void 3, maximum void 3
#COLUMNVOID = 1, void void 1
#COLUMNVOID = 2, void void 2
#COLUMNVOID = 3, void void 3
#COLUMNTEXT = 0 or 1, yes or no
#COLUMNSEPARATOR = ;
#RECORDSEPARATOR = !
#LASTSCAN = number of scans
```
#MEASUREMENTVAR = 1, $z_{groundlevel}$, m, height of gound level with respect to the datum in ZID
#MEASUREMENTVAR = 2, z_{filter}, m, height of the filter with respect to the datum in ZID
#MEASUREMENTVAR = 4, z_{offset}, kPa, zero offset of the PR.
#MEASUREMENTVAR = 6, $t_{install}$, days, number of days between the date of installation and startdate.
```
#STARTDATE = 2000, 1, 1
#STARTTIME = 0, 0, 0.0
#EQUIPMENT = Unique ID for the PR; usually its serial number
#TESTID = Alias
```
#XYID = code, X, Y[, Δx, Δy]
#ZID = code, Z[, Δz]

1.3 Free keywords

The following keywords have been assigned:

#MEASUREMENTVAR = 10, number, km, location along a road; railroad; power line or dike
#MEASUREMENTTEXT = 10, code[, code for such a line]

Other keywords may be used, but don't have a agreed meaning between sender and receiver of the file, especially keywords like Measurementtext and Measurementvar.

2 Example

```
#GEFID = 1,0,0
#EQUIPMENT = 123456789012
#COLUMN = 3
#COLUMNINFO = 1, days, time, 1001
#COLUMNINFO = 2, kPa, pressure, 1002
#COLUMNINFO = 3, mWk, head, 2001
#FILEDATE = 1999, 11, 10
#PROJECTID = Betuwelijn
#FILEOWNER = Ats
#PROCEDURECODE = GEF-PR-Measurement, 1, 0, 0, pr100.pdf
#MEASUREMENTCODE = GEF-PR-Measurement, 1, 0, 0, pr100.pdf
#COMPANYID = GeoDelft, 8000.97.476.B.01, 31
#COLUMNMINMAX = 1, 77.45, 107.34
#COLUMNMINMAX = 2, 16.17, 18.87
#COLUMNMINMAX = 3, 1.20, 1.47
#COLUMNVOID = 1, -1000.0
#COLUMNVOID = 2, 1000.0
#COLUMNVOID = 3, 1000.0
#COLUMNTEXT = 1, Yes
#COLUMNSEPARATOR = ;
#RECORDSEPARATOR = !
#LASTSCAN = 10
#MEASUREMENTVAR = 1, 2.56, m, height of the ground level
#MEASUREMENTVAR = 2, -1.67, m, height of the filter
#MEASUREMENTVAR = 4, 16.17, kPa, zero offset of the PR.
#MEASUREMENTVAR = 6, 14, days, number of days between startdate and installation
#STARTDATE = 2000, 1, 1
#STARTTIME = 0, 0, 0.0
#TESTID = R103O14
#XYID = 31000, 86685.527, 454747.335, 1.0, 0.0
#ZID = 31000, -1,67
#EOH=
77.45;16.17;1.20;!
80.45;16.47;1.23;!
83.66;16.77;1.26;!
87.25;17.07;1.29;!
90.67;17.37;1.32;!
93.45;1000.0;1000.0;Powersupply to low;!
96.51;17.97;1.38;!
99.56;18.27;1.41;!
104.55;18.57;1.44;!
107.34;18.87;1.47;!
```

3 General

In the next sections the commonly used keywords are briefly described. For an extended description is refered to www.geffiles.org/language/index.html. The type of file is a registration of a single transducer.

3.1 Compulsory keywords

This type of keywords should always be present in a GEF file, irrespectively of the standard used. The order of appearance of nearly all keywords does not matter. Exceptions are GEFID which should be the first keyword of the header and EOH which should be the last keyword of the header.

#GEFID = *release*, *version*, *update*
States the type of file: a GEF file. Currently the release, version and update of a GEF file can be either 1, 0, 0 or 1, 1, 0. This keyword should be the first keyword in the header.

#COLUMN = *n*
The number of columns, n is max. 250

#COLUMNINFO = *i, unit, quantity, quantitynumber*
Provides information for the i-th column. Which unit (e.g. kPa) and which quantity (e.g. pore pressure) has been reported. The quantity number is an identification for the type of quantity and specific transducer. It allows for an easy automatic recognition, irrespectively of the language and spelling of the quantity. The number of lines with COLUMNINFO in the header should be exactly the same as the number of columns, reported in COLUMN.

#FILEDATE = *yyyy, mm, dd*
The date on which the file was generated: year, month and day. yyyy should be Y2k compliant.

#PROJECTID = *type*[, *number*[, *subprojectnumber*]]
Projectidentification. The first field is compulsory, the second an third fird are optional. It identifies the company that has performed the measurements. Usually type is CO (commercial), number is the project number, and subprojectnumber is what it describes: the number of the subproject.

#FILEOWNER = *name*
The name of the person responsible for the header and data in this file.

#EOH=
Marks the end of the header, no other keywords may follow this keyword. After the = sign of #EOH= a carriage return and linefeed (Windows) or linefeed (Unix) is added. The data follows the linefeed immediatedly.

3.2 Compulsory keywords for this standard.

The keywords are strictly spoken, not compulsory for a correct GEF file, however for the correct interpetation of this specific type of measurement, these keywords are vital.

#PROCEDURECODE = *code*, *release*, *version*, *update*, *referencedocument*
The code states which method of measuring, analysis, filing and reporting has been followed or should be followed. Release version and update provide information about the updates in the past: which specific method has been followed. The referencedocument refers to a written

document, in which the standard is described. It can be a document, as written by the user itself, but it may be an official document of e.g. ASTM, NEN or ISO as well.

#MEASUREMENTCODE = *code*, *release*, *version*, *update*, *referencedocument*
The code states which method of measuring has been followed or should be followed. Release version and update provide information about which version of the measuring standard has been used. The reference document refers to a written document, in which the standard is described. It may be an official document of e.g. ASTM or ISO, or a chapter of the quality manuals of a company.

#COMPANYID = *Name of the company*, *VAT number*, *country code*
Identifies which company has created the file. The VAT number is a unique code which is used in the countries of the European union by the government (Finance department) to identify a company. The country code is equal to the international access number for a country. The Netherlands is 31, Belgium is 32, UK 44, Germany 49 etc.

#COLUMNVOID = *i, value*
If a or more scans in the i-th column are not measured or are not valid, value is used to indicate that this scan should not be processed. For value usually a number is chosen, which is not likely to occur, like -9999.

#COLUMNMINMAX = *i*, *minimum of column i*, *maximum of column i*
Provide the information about the minimum and maximum values in the i-th column. If a COLUMNVOID for the i-th column has been defined, these scans are skipped.

#COLUMNSEPARATOR = *character*
For additional data integrity of ASCII files a character can be used to separated columns.

#COLUMNTEXT = *toestand, explanation*
Provides information whether after the last column in a scan additional comments have been written.

#EQUIPMENT = *TransducerID*
Which transducer (serial number) has been used.

#LASTSCAN = *Number of scans*
The last valid scan in a file. Maximum is 2^{31} (about 2×10^9)

#MEASUREMENTVAR = *i*, *value*, *unit, quantity*
Provide information on static data: its value, its unit and which quantity has been measured. Maximum of 1500 measurementvars.

#RECORDSEPARATOR = *character!*
For additional data integrity of ASCII files a character can be used to separated records (=scans).

#STARTDATE = *yyyy*, *mm*, *dd*
The year, month and date a test has started. It may be used as a zero date, e.g. January 1th, 2000. yyyy should be Y2k compliant.

#STARTTIME = *hh*, *min*, *sec*
The hour, minute and second the measurement has started. It may be used as a reference time, e.g. 00, 00, 0.0

#TESTID = *Alias*
A nickname of the transducer, e.g. pore pressure transducer nr. 5 in row 17.

#XYID = *code*, *x*, *y*[, *Dx*, *Dy*]
The location of the transducer. Code refers to a particular coordinate system. x and y are the values. Δx, Δy are optional, they signal the uncertainty in the location.

#ZID = *code*, *Z*[, *Dz*]
The heigth of the ground level. Code refers to a specific datum. The height is usually expressed in m. Δz is optional, it provides information about the uncertainty of the measured height.

3.3 Optional keywords

As a matter of fact all keywords not mentioned above are optional. One is free to add them, but do not expect a specific meaning, since there has been no arrangement for these keywords in the context of the standard, especially keywords like Measurementtext and Measurementvar. Merely for cosmetic purposes.

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