

Accepted Manuscript

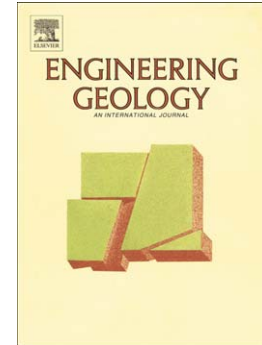
Observations on the Desiccation and Cracking of Clay Layers

R.N. Tollenaar, L.A. van Paassen, C. Jommi

PII: S0013-7952(17)30131-X
DOI: doi:[10.1016/j.enggeo.2017.08.022](https://doi.org/10.1016/j.enggeo.2017.08.022)
Reference: ENGEO 4631

To appear in: *Engineering Geology*

Received date: 23 January 2017
Revised date: 6 June 2017
Accepted date: 22 August 2017



Please cite this article as: Tollenaar, R.N., Paassen, L.A. van, Jommi, C., Observations on the Desiccation and Cracking of Clay Layers, *Engineering Geology* (2017), doi:[10.1016/j.enggeo.2017.08.022](https://doi.org/10.1016/j.enggeo.2017.08.022)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Observations on the Desiccation and Cracking of Clay Layers

R.N. Tollenaar^{a,*}, L.A. van Paassen^{a,1}, C. Jommi^a

^a*Department of Geoscience and Engineering, Delft University of Technology,
Stevinweg 1, 2628 CN Delft, The Netherlands*

^b*School of Sustainable Engineering and the Built Environment (SSEBE), Center for
Bio-mediated and Bio-inspired Geotechnics (CBBG), Arizona State University,
Goldwater Center for Science & Engineering, 650 East Tyler Mall, PO Box 873005,
Tempe, AZ 85287-3005, U.S.A.*

Abstract

Waterways and lakes in low-lying delta areas require regular dredging for maintenance. Often these sediments are placed on land, where they are allowed to ripen through a combination of drainage, consolidation and evaporation. When cracks develop during desiccation, the physical response of the soil is affected by changes in the overall strength, stiffness and permeability of the material. To better identify how cracks form and propagate, a series of tests was carried out in a controlled laboratory environment on samples of drying clay slurries under different initial and boundary conditions. The outcomes of this study indicate that the results from laboratory small scale models must be carefully analyzed, as they depend on the area and the thickness of the sample. However, common features from the different tests can be identified, which are mostly related to the intrinsic behavior of the material. For instance, the water content at which cracks initiate depends mostly on the drying rate and not only on the initial water content. Typically for the clayey soil investigated, the cracking water content is well above the shrinkage limit and in some instances even above the liquid limit. Cracks can form anywhere a defect is encountered, but it was observed that they propagate in horizontal directions below the soil surface. On the soil surface they tend to intersect with each other perpendicularly, suggesting

*Corresponding author

Email address: r.n.tollenaar@tudelft.nl (R.N. Tollenaar)

Download English Version:

<https://daneshyari.com/en/article/5787422>

Download Persian Version:

<https://daneshyari.com/article/5787422>

[Daneshyari.com](https://daneshyari.com)