

System dynamic plan as a comparison framework and decision model for the competent authority

Referent Pieter de Boer, Author Jos.G.M. Wieggers², co author Simone Houtman, Co author Harry Hofman, co author Arjen Ros co author Egbert Roos

Rijkswaterstaat, Postbus 2232 ,3500 GE Utrecht, NL

Grondbank Nederland, Westkanaaldijk 2 gebouw 2 3542 DA Utrecht NL

Copernicos Kennedylaan 8, 3533 KH Utrecht NL

Phone: +32-(0)-6-51244772

E-mail: Jos.wieggers01@rws.nl

Conference theme number(s): 5.

Sediment management concepts and sediment policy

Introduction

In connection with the desire to better repurpose soil use of sediments in the Netherlands from the construction of Water Framework Directive (WFD) projects, the soil flow model was developed in the course of 2022 as a tool for improve the circular economy around soil remediation.

The system dynamic soil flow model is a system dynamics model, which has been developed to simulate flows of soil throughout the process of extracting from, transportation and dumping or applying soil to various possible and useful destinations. System dynamics is a scientific field where mathematical models are used to study and understand behavior over time of complex systems. The model, which is currently under further development, takes into account various indicators as costs, value, emissions in order to get a more complete set of variables which are meant to improve decision making.

It is customary in the Netherlands to process all kinds of emerging materials in road and hydraulic engineering works.

In some cases, the soil flow model will break with this working method because in sectors other than civil engineering soil can sometimes be given a much better circular social value.

The destinations therefore include other sectors than the usual end use, such as the agricultural sector, tree nurseries and the brick industry and sometimes also the ceramic industry. This maintains or even improves the value of the Soil.

The basis for a well-functioning soil flow model is the knowledge of where materials are offered and where materials are requested. At this point, the national water framework directive team works with a national GIS map that includes the supply of WFD and the

demand from the flood protection program, which already coordinates a lot of supply and demand.

The coordination between different parties is important because soil that is not suitable for use in civil engineering can, for example, be used very well in other sectors where other requirements are set for the soil.

The model has now proven itself in the LIFE project Co2 Sand Due to the use of the model by Rijkswaterstaat, the application is broader, making the LIFE project more interesting for the European Union. The model is now being further developed in the WFD measure Floodlands Wamel Dreumel Heerewaarden and in innovation project Innova 58 where the first exercises are taking place.

Although the model for Rijkswaterstaat is in the experimental phase, it has great potential for a more sustainable reuse of all released materials.

The proposal is to include the results of using the model as a destination in the realization contracts of the WFD or to ensure that the contractor of WFD is also the contractor of the destination

References: [1] Forrester, J.W. (1961) Industrial Dynamics, Cambridge: MIT press [2] Sterman, J.D. (2000) Business Dynamics, Systems Thinking and Modeling for a Complex World, The McGraw-Hill Companies, Inc.

**Please submit your abstract before the 1st
of March 2023 to the SedNet secretariat:
secretariat@sednet.org.**