

DIANA Users Association

Annual report 2015

20-11-2016



Dr.ir. A. de Boer
Chairman DIANA User's Association

Annual Report 2015

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1 Aim of the Association

The members of the Association are all users of the DIANA software package of TNO-DIANA BV.

In this capacity, they have a considerable interest in gaining knowledge in the Finite Element Method and (numerical) mechanics, as well as in the further development and extension of DIANA.

To achieve this, the Association fulfils a coordinating role by taking stock of the members' needs in terms of research and development, and initiating new projects.

The Association is also a meeting place for the exchange of experiences with the software package.

Furthermore, TNO-DIANA BV utilizes the Association to inform the Users on the DIANA package development progress.

2 Executive Committee 2015

During this reporting year, the Executive Committee consisted of:

Chairman: Dr.ir. A. de Boer, Centre for Infrastructures, Ministry of
Infrastructures and the Environment, Utrecht
Secretary/ Treasurer: ir. C. v.d. Vliet, Arcadis Nederland BV
Committee member: ir. H.G. Burggraaf, TNO Structural Reliability

The Executive Committee has mainly dealt with the following:

1. Discussion on continuing new research projects on the basis of a national and international user's wish list.
2. Organizing of the 10th International DIANA Users Meeting in Barcelona, Spain.
3. Continuing contributing to the set-up a database with publications related to DIANA or FEA.
4. Extending the existing e-mail database with foreign users in the fields of concrete, concrete mechanics, bridges and tunnels.
5. Preparation of general and technical meetings.
6. Association finance.
7. Progress in an international response/discussion forum around developments now and in the future related to Users Wishes.

3 Activities

3.1 General

The Association holds a general meeting of members twice a year, followed if possible by a technical meeting (lectures). In 2015 there have been held one technical meeting, lecture evening.

3.2 Technical lectures June 10th, 2015

Earthquakes and EEM

Niels Kostense, Arcadis

In the meantime, the NPR has appeared in the green draft version and consultants are busy, either for the NAM, whether it is for a group of citizens, for the industrial area, or for the government to map the effects of the earthquake in the province Groningen. New structures can be designed with help from this NPR; existing structures will be reviewed again with the same NPR. Arcadis is one of these parties en will report about this. Arcadis uses DIANA to determine the seismic resistance from existing structures using non-linear time-history of old-governor analysis. This happens when the type of structure asks for it (monument or multiple) or when taking into account for example, cracking masonry or soil-structures interaction is required.

Prediction failure behaviour T-girder Contest Parma

Shen Ma, ABT

At the end of March, the Contest prediction has been written by DOV in collaboration with the TU-Delft and the University of Parma. Until September, the participants got time to hand in their predictions. During a workshop in Parma, all predictions have been presented through a pitch presentation to all the attendees.

One of the submissions from the private sector came from the ABT, which was the reason why the approach from the private sector was discussed more broadly than the 6 minutes speaking time in Parma.

Kani, the switch from bending moment to shear force failure

Yuguang Yang, TU Delft

As a PhD student Yang was already involved by the well-known shear force research from RWS and in the meantime as a researcher who works at the University of Delft, Yang has a few reinforced girders are tested by the bending moment capacity or the shear force with variations at the location of the load in relation to the location of the support. Goal of this research is to come to a precise description of the specific switch point of ultimate failure based on the bending moment or the shear force.

This is known inside the concrete society as the point of Kani, who created this phenomenon already in 1964. With the proposed shear force model that Yang established in his promotion research, these new experiments can buttress his shear force model.

Prediction failure behaviour T-girder; Contest Parma, the winner!

Joop den Uijl, formerly TU-Delft

While at the end of 2007 during the RWS workshop about shear force failure, there were results of a bandwidth of 50-150%. At the workshop in Parma in 2014 it has appeared that based on the NLFEA Guideline:2012, a bandwidth has been reached of 80-115%. This was a great result of the workshop, which consisted of many different participants, different countries and different FE codes. The NLFEA Guideline can be improved and will get a new version in 2016. This new version can be downloaded from the DIANA Users Association website.

Of course there was also a Contest winner who received the 500 euros. The additional results were the deciding factor, because the ultimate failure load with the number 2 of this competition has come under the 1%. In this presentation the approach of the modelling of the T-girder, the used material models etc. will be discussed.

3.3 International DIANA Users Meeting, 29th and 30th October 2015, Barcelona, Spain

Lectures

Jesús Miguel Bairan, Department of Construction Engineering, UPC, Barcelona, Spain

Capturing 3D effects and non-linear response in concrete frame elements by means of high order cross-section models

Bogdan Orlic, B.B.T. Wassing, Netherlands

Field-scale three-dimensional geomechanical modelling of gas reservoirs: workflow and case studies

Morten Engen, Max A. N. Hendriks, Jan Arve Øverli, Erik Åldstedt, Norway

A Material Model Suitable for NLFEA of Large Reinforced Concrete Structures

Ignasi Fernandez Perez, Jesús M. Bairan, Antonio R. Mari, Sweden

Modelling of corroded steel reinforcement bars based on 3D scan geometry

Cor van der Veen, Netherlands

Shear Behaviour of prestressed dapped end beams

Prof. Rui Faria, University of Porto, Faculty of Engineering, Portugal

Assessment of structural concrete behaviour with advanced numerical modelling

Michele Simoni, Andrea Chiozzi, A. Tralli, Italy

On nonlinear analysis of historical masonry monuments damaged by Emilia 2012 earthquake

Marcel 't Hart, Dirk Jan Peters, Netherlands

Local buckling of large diameter steel tubes (partly) filled with sand

Noemi Duarte, Ulric Celada, Jesús M. Bairan, Antonio R. Mari, Spain

Numerical and analytical simulation of partially prestressed beams

Coen van der Vliet, Ronald W.M.G. Heijmans, Netherlands

Feasibility immersed tunnel in seismic region

Sebastian W.H. Ensink, Cor van der Veen, Ane de Boer, Netherlands

Shear tests on large T-shaped Prestressed Concrete Beams

Elena V. Sarmiento, Max A.N. Hendriks, Terje Kanstad, Norway

Accounting for the fibre orientation on the structural performance of flowable fibre reinforced concrete

Richard Roggeveld, Frank J. Kaalberg, Netherlands

Assessment of Loading Capacity Fire-Fighting-Platform

Jiangpeng Shu, Mario Plos, Kamyab Zandi, Karin Lundgren, Sweden

Numerical prediction of punching behaviour for RC bridge deck slabs using 3D continuum non-linear FE analysis

Yuguang Yang, Netherlands

Calculation and modelling of a shear test on a 4 meter concrete slab strip without shear reinforcement

Ab van den Bos, TNO DIANA BV, Netherlands

DIANA SUPPORT issues

Beatrice Belletti, Cecilia Damoni, Max Hendriks, Ane de Boer, Italy

Validating the Guidelines for Nonlinear Finite Element Analysis

Gerd-Jan Schreppers, TNO DIANA BV, Netherlands

New DIANA Release 10

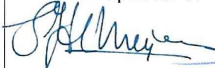
DIANA wishes from the Users, Ane de Boer

4. Financial aspects 2015

SAMENVATTING BIJ FINANCIËEL JAARVERSLAG 2015

Balans	31 december 2015	1 januari 2015
ACTIVA		
Vaste activa	€	
	€	
Viottende activa		
Vorderingen	€ 5 585	€ 3 850
Liquide middelen	€ 28 657	€ 27 720
	€ 34 243	€ 31 570
Totaal activa	€ 34 243	€ 31 570
PASSIVA		
Eigen vermogen	€ 32 884	€ 30 694
	€ 32 884	€ 30 694
Kortlopende schulden	€ 1 359	€ 876
	€ 1 359	€ 876
Reserveringen en voorzieningen	€	
	€	
Totaal passiva	€ 34 243	€ 31 570

Winst- en verliesrekening 2015	debet	credit
Netto omzet	€	€ 10 230
Kostprijs van de omzet	€ 5 349	€
Bruto omzetresultaat	€	€ 4 881
Personeelskosten	€ 3 044	€
Algemene beheerskosten	€ 478	€
Financiële baten	€	€ 773
Financiële lasten	€	
Resultaat uit gewone bedrijfsvoering	€ 2 749	€
Buitengewone baten en lasten	€	€ 58
Resultaat (winst)	€	€ 2 190

Penningmeester DOV:	Accordering kascommissie:
datum: 8 mei 2017	datum: 21 april 2017 datum: 25-04-17
	
Coen van der Vliet	Sander Meijers
	Ostar Joostenz

5. Publication list 2015

ABT

R.H.G. Roijackers, R.H.J. Bruins, Rekenmethodes voor seismisch rekenen, Bouwen met Staal 248, December 2015.

M. Verbaten, A. Middelkoop, Innovatie versterkingsmethode balkons, Cement 2015/5.

ARCADIS & Delft University of Technology

R. Veerman, K. v. Breugel and E. Koenders (2015) Effect of Corrosion on the Fatigue Service-life on Steel and Reinforced Concrete Beams, FIB Symposium 2015, Copenhagen Denmark, 18-20 May 2015

Chalmers University

Lundgren, K., Zandi, K., Nilsson, U. (2015). A model for the anchorage of corroded reinforcement: validation and application, fib Symposium, Copenhagen, 18-20 May 2015.

Lundgren, K., Plos, M., Tahershamsi, M., & Zandi, K. (2015). 3D Modelling of the bond behaviour of naturally corroded reinforced concrete. *Noric Concrete Research*, 2(53), 35–38.

Lundgren, K., Plos, M., Zandi, K., & Tahershamsi, M. (2015). Anchorage of corroded reinforcement—from advanced models to practical applications. *Noric Concrete Research*, 2(53), 43–47.

Zandi, K. (2015) Corrosion-Induced Cover Spalling and Anchorage Capacity, *Structure and Infrastructure Engineering* (1573-2479). Vol. 11 (2015), 12, p. 1547-1564.

Zandi, K., Lundgren, K. (2015) Numerical 3D modelling of anchorage, corrosion and spalling, fib Symposium, Copenhagen, 18-20 May 2015.

Zandi K. (2015) Corrosion-induced Cover Spalling in RC Structures. The Fifth International Conference on Construction Materials (CONMAT'15): Performance, Innovations and Structural Implications, August 19 – 21, 2015, Whistler, BC, Canada.

Shu, J., Plos, M., Zandi, K., & Lundgren, K. (2015). A Multi-level Structural Assessment Proposal for Reinforced Concrete Bridge Deck Slabs. *Noric Concrete Research*, 2(53), 53–56.

Shu, J., Fall, D., Plos, M., Zandi, K., & Lundgren, K. (2015). Development of modelling strategies for two-way RC slabs. *Engineering Structures*, 101, 439–449.

Lorenzo Miccoli, Patrick Fontana, Gabriel Johansson, Kamyab Zandi, Natalie Williams Portal, Urs Müller (2015) Numerical modelling of UHPC and TRC

sandwich elements for building envelopes, IABSE Conference - Structural Engineering: Providing Solutions to Global Challenges, September 23-25 2015, Geneva, Switzerland, p. 195-203.

TNO Geo-energy, Utrecht

Buijze, L., Orlic, B., Wasssing, B.B.T., Schreppers, G.-J. (2015).
Dynamic rupture modelling of injection-induced seismicity: Influence of pressure diffusion below porous aquifers. Proc. of the 49th US Rock Mechanics / Geomechanics Symposium (ARMA), San Francisco. Paper no ARMA 15-384.

Karstens, J., Berndt, C., Bünz, S., Tasianas, A., Class, H., Ahmed, W., Orlic, B. (2015). WP1 summary report relevant for risk assessment.
Deliverable 1.3, Sub-seabed CO2 Storage: Impact on Marine Ecosystems (ECO2).

Klimkowski, Ł., Nagy, S., Papiernik, B., Orlic B., Kempka, T. (2015).
Numerical simulations of enhanced gas recovery at the Załęcze gas field in Poland confirm high CO2 storage capacity and mechanical integrity.
Oil & Gas Science and Technology - Rev. IFP Energies nouvelles. 70, 4:655-680.
DOI: 10.2516/ogst/2015012.

Wassing, B.B.T. (2015). Modelling of fault reactivation and fault slip in producing gas fields. Proc of the 2nd EAGE Workshop on Geomechanics and Energy, Celle. Extended abstract.

Wassing, B.B.T., Buijze, L., Fokker, P., Orlic, B., Van Thienen, K., Van Wees, J.-D. (2015). Production-induced fault reactivation and seismicity in the Netherlands - from quick scan to 3D geomechanical modelling.
Proc. of the 77th EAGE Conference and Exhibition, Madrid. Extended Abstract.

TNO DIANA BV

A framework for wellbore cement integrity analysis
Gerd-Jan Schreppers, TNO DIANA
Published: ARMA 2015 (copyright ARMA)

Aardbevingen en EEM - Beoordeling aardbevingbestendigheid woontoren met twee EEM-analyses
Ab van den Bos, TNO DIANA. Published: CEMENT Magazine (copyright CEMENT)

On the use of embedded pile elements for the numerical analysis of disconnected piled rafts.
Fabio Tradigo (Arup); Federico Pisano (TU Delft); Claudio di Prisco (Politecnico di Milano)
Published: Elsevier (copyright Elsevier)

Rekenmethodieken voor seismische belasting
Pim van der Aa (TNO DIANA BV). Published: KOersief 96 (copyrighted)

Earthquake Assessment of Luzzone dam using DIANA
W P Kikstra, J Manie, G Schreppers (TNO DIANA BV)
Published: ICOLD Benchmark Workshop 2015

Towards mode selection criteria for multi-mode initial postbuckling analysis of composite cylindral shells.
E.L. Jansen, R. Rolfes (Leibniz Universität), T. Rahman (TNO DIANA BV)
3rd International Conference on Buckling and Postbuckling behaviour of Composite Laminated Shell Structures; Branschweig, Germany

For more information:
<https://www.youtube.com/user/TNODianaBV>

Royal HaskoningDHV

Meijers, S.J.H., Bakker, G.J., Kraus, J.G., Analysis of major leak loading of LNG storage tanks, in Proceedings of the International Association for Shell and Spatial Structures (IASS) symposium 2015, Amsterdam, August 2015.

Ministry of Infrastructure & RHDHV & WMC

Ernst Klamer, Liesbeth Tromp, Ane de Boer, Rogier Nijssen, ‘Long term effects of wet and outdoor conditions on GFRP’, IABSE2015, Geneva, Switzerland

Ministry of Infrastructure

Ane de Boer, ‘Composite structures in infrastructure NL’, Workshop FRP, Dutch Embassy, Stockholm, Zweden

Ane de Boer, ‘Assetmanagement and ASR damage’, InfraQuest-Danish Workshop, InfraQuest, TU Delft, Delft

Ane de Boer, ‘Kunststof toepassingen in de Nederlandse infrastructuur’, U-Gent Workshop: Gebruik van composieten voor bruggen, Gent, Belgie

Ane de Boer, ‘Van risicogestuurd inspecteren naar geavanceerde analyses’, Infraquest Marktdag, 2015

Ane de Boer, ‘Ontwikkeling verkeersbelastingmodellen statisch en vermoeiing’, InfraQuest, Marktdag, 2015

Ane de Boer, Re-examinations of existing bridge decks and viaducts in the Netherlands’, Workshop Nordic Concrete, Oslo, Norway

Ane de Boer, ‘Twaalf jaar meten aan viaducten aangetast door ASR t.b.v. beheersbaarheid Constructieve veiligheid van bestaande constructies’, WOW bijeenkomst, Den Bosch

Ane de Boer, ‘Constructieve veiligheid van bestaande constructies; op zoek naar reserve capaciteit als aanvulling op regelgeving nieuwe constructies’, WOW bijeenkomst, Haarlem

Delft University of Technology & Ministry of Infrastructure

E.O.L.Lantsoght, C. van der Veen, A. de Boer, Reliability-based expression for the shear capacity of reinforced concrete slabs under concentrated loads close to supports’, ESREL2015, Zurich, Switzerland

Eva Lantsoght, Cor van der Veen, Ane de Boer, ‘Improved Formulation for Compressive Fatigue Strength of Concrete’, *Concrete Repair, Rehabilitation and Retrofitting IV*

Eva O. L. Lantsoght, Cor van der Veen, Joost C. Walraven, Ane de Boer, Transition from one-way to two-way shear in slabs under concentrated loads, ICE Magazine of concrete research, vol 67, issue 17

Ir. S.W.H Ensink Dr.ir. C. van der Veen Dr.ir. A. de Boer, SHEAR OR BENDING? EXPERIMENTAL RESULTS ON LARGE T-SHAPED PRESTRESSED CONCRETE BEAMS, Edinburgh

Eva Lantsoght, Cor van der Veen, Ane de Boer, Joost Walraven, ‘Querkrafttragfähigkeit von Platten nahe Auflagern –Übersicht diverser Versuche’, Beton und Stahlbau, Duitsland

Sana Amir, Cor van der Veen, Joost C. Walraven and Ane de Boer, ‘EXPERIMENTS ON PUNCHING SHEAR BEHAVIOR OF PRESTRESSED CONCRETE BRIDGE DECKS’, ACI Journal

Ministry of Infrastructure & Delft University of Technology & University of Parma

Ane de Boer, Max A.N. Hendriks, Cor van der Veen, Beatrice Belletti, ‘Nonlinear structural analysis as an assessment tool for existing concrete structures, IABSE2015, Geneva, Switzerland

A. de Boer, M.A.N. Hendriks, C. van der Veen, S.W.H. Ensink, B. Belletti, EVALUATION AND THE PROGRESS OF CONCRETE GIRDER NONLINEAR ANALYSIS BY CONTESTS, NWC2015, NAFEMS, San Diego, USA

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