Holger Koss
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Department of Civil and Mechanical Engineering
Structural Engineering and Structural Mechanics
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Profile

Hans Holger Hundborg Koss is an Associate Professor at the Department of Civil and Mechanical Engineering, Section for Structures and Safety, at the Technical University of Denmark (DTU) in Kgs. Lyngby, Denmark. His long-standing research experience is in the field of **Wind Engineering** and **Structural Dynamics** with particular focus on the simulation of wind loads on buildings and structures (experimentally and numerically), their static and dynamic response and the climatic behaviour of the **Urban Environment**. With his design work on a specialised **Climatic Wind Tunnel** in 2008-2009, his research expanded to cold climate effects on aerodynamic performance of bridge cables and wind turbine blades, especially related to **Atmospheric Icing**. With the investigation of topology optimisation of minimal structures under stochastic loading in 2016, he embarked on the field of **3D Additive Manufacturing**. This activity lead subsequently to the development of an innovative **Biopolymer-based Composit** as a building material allowing a high degree of freedom in the printing process.
His teaching covers Wind Engineering, Wind Tunnel Testing, Structural Engineering, Probabilistic Modelling, Urban Environments and Experimental Structural Mechanics on both basic and advanced level.

Qualifications

Influence of wind simulation on the overload risk of low-rise steel structures (Ph.D. Thesis), Ruhr-University Bochum, Germany
Influence of wind simulation on the overload risk of low-rise steel structures
(Ph.D. Thesis)
1995 → 2000

European Research Network (HCM) on Wind Engineering, CSTB, Nantes (France) ; DMI, Lyngby (Denmark)
Apr 1994 → Nov 1994

Civil Engineering - Master Thesis, Ruhr-University Bochum, Germany
1987 → 1994

Ph.D. (Dr.-Ing.)

Employment

Associate Professor
Department of Civil and Mechanical Engineering
Technical University of Denmark
Kgs. Lyngby, Denmark
2 Jun 2022 → present

Structural Engineering and Structural Mechanics
Technical University of Denmark
Kgs. Lyngby, Denmark
31 Oct 2023 → present

Research outputs

Rheological characterization of temperature-sensitive biopolymer-bound 3D printing concrete
Christ, J., Perrot, A., Ottosen, L. M. & Koss, H., 2024, In: Construction and Building Materials. 411, 14 p., 134337.

Vibration-Based Damage Detection of a Monopile Specimen Using Output-Only Environmental Models
Lydakis, E., Amador, S. D. R., Koss, H. & Brincker, R., 2024, *Topics in Modal Analysis & Parameter Identification, Volume 9: Proceedings of the 41st IMAC, A Conference and Exposition on Structural Dynamics 2023* . Dilworth, B. J., Marinone,

T. & Mains, M. (eds.). Springer, p. 163-168 (Conference Proceedings of the Society for Experimental Mechanics Series, Vol. 9).

Multi-axial 3D printing of biopolymer-based concrete composites in construction
Christ, J., Leusink, S. & Koss, H., 2023, In: Materials and Design. 235, 10 p., 112410.

Cross-flow aerodynamics of bridge cables with wire meshes
Matejicka, L., Koss, H. H. & Georgakis, C. T., 2022, In: Journal of Wind Engineering and Industrial Aerodynamics. 223, 12 p., 104941.

10 Years Research and Application in the Climate Wind Tunnel
Koss, H., Kim, T., Larsen, S. V. & Georgakis, C. T., 2021, *Proceedings of the Danish Society for structural Science and Engineering.* 2 ed. Danish Society for Structural Science and Engineering - Dansk Selskab for Bygningsstatik, Vol. 91. p. 47-94

Two-level friction damping and its application for passive multi-functional vibration control of high-rise buildings
Friis, T., Katsanos, E. I., Saberi, M. & Koss, H. H. H., 2021, In: Engineering Structures. 239, 27 p., 112310.

Combined effects of wind and atmospheric icing on overhead transmission lines
Rossi, A., Jubayer, C., Koss, H., Arriaga, D. & Hangan, H., 2020, In: Journal of Wind Engineering and Industrial Aerodynamics. 204, 15 p., 104271.

Engineering approach for a CFD inflow condition using the precursor database method
Thordal, M. S., Bennetsen, J. C., Capra, S. & Koss, H., 2020, In: Journal of Wind Engineering and Industrial Aerodynamics. 203, 104210.

Ice-shedding and aerodynamic investigations of bridge cables with steel wire meshes
Matejicka, L., Georgakis, C. T., Koss, H. H. & Egger, P., 2020, *IABSE Congress, Christchurch 2020: Resilient Technologies for Sustainable Infrastructure: Proceedings.* Abu, A. (ed.). International Association for Bridge and Structural Engineering, p. 94-102

Towards a standard CFD setup for wind load assessment of high-rise buildings: Part 2 – Blind test of chamfered and rounded corner high-rise buildings
Skytte Thordal, M., Bennetsen, J. C., Capra, S., Kragh, A. K. & Koss, H. H. H., 2020, In: Journal of Wind Engineering and Industrial Aerodynamics. 205, 14 p., 104282.

A concrete composite from biologically based binders and mineral aggregates for constructional 3D-printing
Christ, J., Ottosen, L. M. & Koss, H., 2019, *Proceedings ICSBM 2019: 2nd International Conference on Sustainable Building Materials.* Vol. 5. p. 93-105 119

Development of Three-Dimensional Icing Simulation Code for Wind Turbines
Son, C., Koss, H. & Kim, T., 2019. 8 p.

On the Ecology of Climate & Structures
Christ, J., Fernandoy-Bak, J., Fiebig, J. & Koss, H., 2019, *Proceedings of the IASS Annual Symposium 2019 – Structural Membranes 2019 Form and Force.* International Association for Shell and Spatial Structures (IASS), 10 p.

Preliminary comparison of the aerodynamics of several concave-filleted bridge cable surfaces
Matejícka, L., Georgakis, C. T., Koss, H. & Egger, P., 2019.

Review for practical application of CFD for the determination of wind load on high-rise buildings
Thordal, M. S., Bennetsen, J. C. & Koss, H. H. H., 2019, In: Journal of Wind Engineering and Industrial Aerodynamics. 186, p. 155-168 14 p.

Cases of Lightweight Structures for Polar Areas
Pedreros, J. F., Christ, J., Shepherd, P. & Koss, H., 2017, *Proceedings of the IASS Annual Symposium 2017 "Interfaces: architecture.engineering.science".* International Association for Shell and Spatial Structures (IASS), 10 p.

Preliminary evaluation of the ice shedding properties of Bridge cable surfaces
Matejicka, L., Georgakis, C. T., Koss, H., Schwarz, A. & Egger, P., 2017.

Vibration Control of Novel Passive Multi-joints Rotational Friction Dampers
Mualla, I. H. & Koss, H., 2017, In: Ce/papers. 1, p. 1473-1482 10 p.

Developing experimental method for investigating snow deposition around buildings using snow substitutes
Koss, H. & Fiebig, J., 2016.

Investigating the influence of cold climate conditions on structural dynamics
Koss, H., 2016.

Effects of ice accretion on the aerodynamics of bridge cables
Demartino, C., Koss, H., Georgakis, C. T. & Ricciardelli, F., 2015, In: Journal of Wind Engineering and Industrial Aerodynamics. 138, p. 98-119 22 p.

Scaling Issues in the Determination of Wind loads on Lattice Masts
Koss, H. & Srouji, R. G., 2015, *Proceedings of the14th International Conference on Wind Engineering.* 9 p.

Überlegungen zur Entwicklung einer Windkomfortrichtlinie
Koss, H., 2015, *Proceedings of 14. Dreiländertagung der WtG.*

Architectural Design in Arctic Regions - Issue of wind-driven snow in a built environment for sustainable urban planning
Fiebig, J. & Koss, H., 2014, *Abstract Book - DTU Sustain Conference 2014.* Kgs. Lyngby: Technical University of Denmark , 1 p.

Effects of surface design on aerodynamic forces of iced bridge cables
Koss, H., 2014, *Proceedings of the Symposium on the Dynamics and Aerodynamics of cables* . 8 p.

Large eddy simulation and wind tunnel experiment of turbulent boundary-layer flow around a floor-mounted cube
Jørgensen, N. G., Koss, H. & Bennetsen, J. C., 2014, *Proceedings of the 6th International Symposium on Computational Wind Engineering* . 8 p.

Quantitative and creative design tools for urban design in cold and windy climates
Koss, H., Jensen, L. B. & Nielsen, T. A. S., 2014, *Proceedings of ARTEK Event 2014.* 13 p.

Experimental Investigation of Aerodynamic Instability of Iced Bridge Cable Sections
Koss, H. & Lund, M. S. M., 2013, *Proceedings of the 6th European and African Wind Engineering Conference.* 8 p.

Experimental study of the effect of icing on the aerodynamics of circular cylinders - Part I: Cross flow
Demartino, C., Koss, H. & Ricciardelli, F., 2013, *Proceedings of the 6th European and African Wind Engineering Conference.* 8 p.

Ice Accretion on Wind Turbine Blades
Hudecz, A., Koss, H. & Hansen, M. O. L., 2013, *Proceedings of the 15th International Workshop on Atmospheric Icing of Structures (IWAIS XV).* 8 p.

Icing wind tunnel tests of a wind turbine blade
Koss, H., Hudecz, A. & Hansen, M. O., 2013, In: Journal of Wind Energy.

Influence of Icing on Bridge Cable Aerodynamics
Koss, H., Frej Henningsen, J. & Olsen, I., 2013, *Proceedings of the 15th International Workshop on Atmospheric Icing of Structures (IWAIS XV).* 7 p.

Understanding and controlling wind-induced vibrations of bridge cables: Results from the Femern Crossing research project
Georgakis, C. T., Jakobsen, J. B., Koss, H., Larsen, S. V., Macdonald, J. H. G., Ricciardelli, F. & Svensson, E., 2013. 4 p.

Embedded-LES and experiment of turbulent boundary layer flow around a floor-mounted cube
Jørgensen, N. G., Koss, H. & Bennetsen, J. C., 2012. 10 p.

Experimental study of ice accretion on circular cylinders at moderate low temperatures
Koss, H. H., Gjelstrup, H. & Georgakis, C. T., 2012, In: Journal of Wind Engineering & Industrial Aerodynamics. 104-106, p. 540-546

Wind Tunnel Tests on Ice Accretion on Wind Turbine Blades
Hudecz, A., Hansen, M. O. L. & Koss, H., 2012

CDIO Projects in Civil Engineering Study Program at DTU
Krogsbøll, A., Simonsen, C., Christensen, J. E., Larsen, T. B., Goltermann, P., Koss, H. & Sand, J., 2011, *Proceedings of the 7th International CDIO Conference, Technical University of Denmark, Copenhagen, June 20 - 23, 2011.* Kgs. Lyngby: Technical University of Denmark

Development of human comfort criteria for environmental conditions in urban areas
Jørgensen, N. G. & Koss, H., 2011, *International Conference on Wind Engineering.* Vol. CD-ROM.

Experimental Study of ice accretion on circular cylinders at moderate low temperatures
Koss, H., Gjelstrup, H. & Georgakis, C., 2011, *International Conference on Wind Engineering.* Vol. CD-ROM.

Annual Report 2009
Stang, H., Hededal, O., Gottlieb, S. W. J., Christensen, I. V., Hertz, K. D., Fritt-Rasmussen, J., Rode, C., Koss, H., Clausen, G., Christensen, H. P., Villumsen, A., Nielsen, J. H., Krogsbøll, A. S., Geiker, M. R., Møller, P., Küter, A., Furbo, S., Goltermann, P. & Welin, C. (ed.), 2010

Bridge Cables - and Wind, Rain, Ice and Snow
Koss, H., Georgakis, C. & Larsen, S. V., 2010, In: Wind Tunnel International. 1, p. 52-55

Design Specifications for a Novel Climatic Wind Tunnel for the Testing of Structural Cables
Georgakis, C., Koss, H. & Ricciardelli, F., 2009, *Proceedings of The 8th International Symposium on Cable Dynamics.*

Drag coefficients of lattice masts from full-scale wind-tunnel tests
Georgakis, C., Støttrup-Andersen, U., Johnsen, M., Nielsen, M. & Koss, H., 2009, *5th European African Conference on Wind Engineering.*

A NEW GENERAL 3DOF QUASI-STEADY AERODYNAMIC INSTABILITY MODEL
Gjelstrup, H., Larsen, A., Georgakis, C. & Koss, H., 2008, *6th International Colloquium on Bluff Bodies Aerodynamics and Applications.*

On differences and similarities of applied wind comfort criteria
Koss, H., 2006, In: Journal of Wind Engineering & Industrial Aerodynamics. 94, 11, p. 781-797

Pedestrian wind comfort assessment criteria: A comparative case study
Deplech, P., Baker, C., Blackmore, P. A., Koss, H., Sanz-Andres, A., Stathopoulos, T. & Willemsen, E., 2005, *4th European & African Conference on Wind Engineering (EACWE4).*

Investigation of maritime helicopter operations
Koss, H., 2004, *Scandinavian Yearbook of Maritime Technology 2004: Scandinavian Shipping Gazette.* p. 13-16 4 p.

Methods in pedestrian wind comfort assessment: theoretical and practical comparisons
Koss, H. & Sahlmen, J., 2002. 20 p.

Einfluß der Simulation des natürlichen Windes auf die Prognose des Überlastrisikos von Hallentragwerken
Koss, H., 2000, Bochum, Germany: Ruhr-Universität Bochum. 178 p.

Influence of a scaling mismatch on wind induced action and action effects
Kasperski, M. & Koss, H., 1999, *Wind Engineering into the 21th Century.* CRC Press/Balkema, Vol. 3. p. 1793-1800 8 p.

Failure risk of portal frames under wind load applying a dynamic plastic analysis
Kasperski, M. & Koss, H., 1998, *Structural Safety and Reliability.* 1 ed. CRC Press/Balkema, Vol. 2. p. 1417-1423 7 p.

BEATRICE Joint Project: Wind Action on Low-Rise Buildings: Part 1 - basic information and first results
Kasperski, M., Koss, H. & Sahlmen, J., 1996, In: Journal of Wind Engineering & Industrial Aerodynamics. 64, p. 101-125

Non-linear dynamic analysis of portal frames under wind action
Kasperski, M. & Koss, H., 1996, *Structural Dynamics.* 1 ed. CRC Press/Balkema, Vol. 1. p. 275-281 8 p.

Limit state design of low-rise portal frames using wind tunnel tests
Kasperski, M., Koss, H. & Holmes, J. D., 1994, *Wind Engineering: Retrospect and Prospect.* 1 ed. New Delhi: Wiley Eastern Limited, Vol. 3. p. 1243-1254 12 p.

Non-linear analysis of portal frames under wind load
Kasperski, M. & Koss, H., 1994, *American Society of Civil Engineers.* American Society of Civil Engineers

Awards

Aerodynamics and icing of bridge cables with concave fillets
Burlina, C., Koss, H., Georgakis, C. T., Larsen, S. V., Fischer, G., Hansen, S. O. & Jakobsen, J. B.
Industrial PhD
15/10/2014 → 13/02/2018

Projects

Aerodynamics and icing of bridge cables with concave fillets
Burlina, C., Koss, H., Georgakis, C. T., Larsen, S. V., Fischer, G., Hansen, S. O., Jakobsen, J. B. & Hansen, S. O.
Industrial PhD
15/10/2014 → 30/09/2019

Cable Aerodynamic Control
Kleissl, K., Georgakis, C. T., Koss, H., Fischer, G., Larose, G. & Larsen, A.
Technical University of Denmark
01/10/2009 → 27/08/2013

Dampers for the Vibration Control of Structural Cables
Krabbenhøft, J., Georgakis, C. T., Poulsen, P. N., Santos, I., Koss, H., Damkilde, L. & Macdonald, J. H. G.

DTU stipendium
01/02/2006 → 04/05/2011

Determination of wind load on high-rise buildings by applying Computational Fluid Dynamics
Skytte Thordal, M., Koss, H., Bennetsen, J. C., Gudmand-Høyer, T., Brincker, R., Bitsuamlak, G. T. & Höffer, R.
Industrial PhD
15/06/2016 → 03/09/2020

Optimised constructions using semi-automated designing and manufacturing tools for minimum resource consumption
Christ, J., Naboni, R., Sinka, M., Koss, H., Bak, J. F., Fischer, G. & Ottosen, L. M.
01/12/2018 → 30/10/2023

Parallel Mono-strand Stay Cable Bending Fatigue
Winkler, J. P., Georgakis, C. T., Fischer, G., Koss, H., Svensson, E. & Caballero, A.
ErhvervsPhD-ordningen VTU
01/04/2011 → 23/02/2015

Pedestrian-induced lateral vibrations of footbridges. Experimental sutdies and probabilistic modelling
Ingólfsson, E. T., Georgakis, C. T., Jönsson, J., Koss, H., Brownjohn, J. M. W. & Macdonald, J. H. G.
DTU stipendium
15/09/2006 → 02/03/2011

Risk Assessment of Stay Cable Fatigue
Roldsgaard, J. H., Georgakis, C. T., Faber, M. H., Koss, H., Chryssanthopoulos, M. & Sørensen, J. D.
Technical University of Denmark
01/02/2011 → 23/02/2015

Stochastic Modeling of Structural Performance of Steel Fiber Reinforced Concrete Structures
Svec, O., Stang, H., Poulsen, P. N., Koss, H., Karihaloo, B., Chanvillard, G. & Olesen, J. F.
Forskningsrådsfinansiering
01/05/2010 → 24/04/2014

Structural Health Monitoring (SHM) of Offshore Platforms
Simantiris, E. L., Koss, H., Diord Rescinho Amador, S. & Høgsberg, J. B.
01/05/2022 → 31/10/2024

SUB 0 "snow and wind - a dimension in arctic built environment
Fiebig, J., Thiis, T. K., Koss, H., Lading, T., Garcia, D. A., Møller, E. B. & Höffer, R.
Samfinansieret - Andet
01/10/2015 → 15/01/2024

Understanding and Simulating wind-induced vibrations of iced vertical cables
Gjelstrup, H., Georgakis, C. T., Koss, H., Larsen, A., Stang, H., Jakobsen, J. B. & Larose, G.
ErhvervsPhD-ordningen VTU
01/01/2006 → 04/05/2011

Understanding of bridge cable vibration mechanisms under varying meteorological conditions
Matteoni, G., Georgakis, C. T., Koss, H., Fischer, G., Jakobsen, J. B., Macdonald, J. H. G., Arentoft, M. & Ricciardelli, F.
ErhvervsPhD-ordningen VTU
01/05/2010 → 23/06/2014