name of the unit:		symbol:
DEPARTMENT OF MICROELECTRONICS AND COMPUTER SCIENCE, Lodz University of Technology		K-22 http://www.dmcs.p.lodz.pl
head of the unit:	potential promoters:	contact person:
Wojciech Tylman Ph.D., D.Sc., Assoc. Prof. Lodz University of Technology	Professor George J. Anders, Ph.D., D.Sc.	George J. Anders george.anders@p.lodz.pl

scope of activities:

My activities relate to the thermal analysis of power cables. My interests are in the development of new mathematical models for ampacity calculations of power cables installed underground or in air. Improvement of the models described in the international standards IEC 60287, 60853 and 60949 is of special interest.

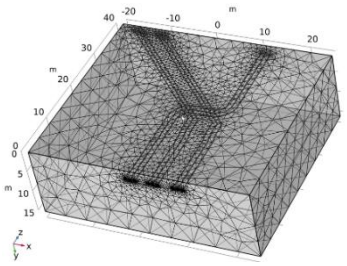
present activities:

Current research involves analysis of:

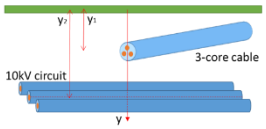
1. Cables in tunnels,
2. Installed in complex underground arrangements,
3. Modelling of 3-core submarine cables,
4. Drying out of soil in the vicinity of loaded power cables,
5. Improvement in the modelling of power cables in COMSOL.

graphic material

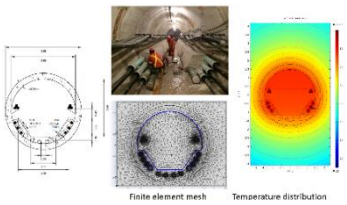
Complex cable arrangements



Cable crossings



Cables in tunnels



Future activities:

Future activities also involve development of the analytical models for cable rating calculations and their verification using the finite element approaches.

Publications/patents, awards, projects:

Publications in 2021:

1. H. Brakelmann, G.J. Anders "Transient Thermal Response of Power Cables with Temperature Dependent Losses", *IEEE Transactions on Power Delivery*, Vol. 35, issue 5, October 2021, pp. 2777-2784, https://doi.org/10.1109/TPWRD.2020.3026779.

2. S. Noufal, G.J. Anders "Sheath losses correction factor for cross-bonded cable systems with unknown minor section lengths: Analytical expressions" *IET Gener Transm. Distrib*. Vol. 15, issue 5, Feb. 2021, pp. 849-859. https://doi.org/10.1049/gtd2.12063.
3. H. Brakelmann and G.J. Anders, "Transient Thermal Response of Multiple Power Cables with Temperature Dependent Losses", *IEEE Transactions on Power Delivery*, Vol. 36, issue 6, December 2021, pp. 3937-3944, https://doi.org/10.1109/TPWRD.2021.30251316.
4. H. Brakelmann, G.J. Anders, "Analysis of the three-dimensional temperature distribution of forced cooled power cables," in IEEE Transactions on Power Delivery, https://doi.org/10.1109/TPWRD.2021.3069760.
5. H. Brakelmann and G. Anders, "A new method for analyzing complex cable arrangements," in IEEE Transactions on Power Delivery, https://doi.org/10.1109/TPWRD.2021.3094666.
6. L. D. Ramirez and G. Anders, "Thermal Analysis of Multiple Cable Crossings," in IEEE Transactions on Power Delivery, https://doi.org/10.1109/TPWRD.2021.3097953.
7. Gulski, E, Anders, G.J., Jongen, R.A., Parciak, J., Siemiński, J., Piesowicz, E., Paszkiewicz, S., Irska, I. „Discussion of Electrical and Thermal Aspects of Offshore Wind Farms' Power Cables Reliability", Sustainable Energy Reviews, August 2021, https://doi.org/10.1016/j.rser.2021.111580.
8. Brakelmann H., Anders G.J., Zając P. "Fundamentals of the Thermal Analysis of Complex Arrangements of Underground Heat Sources", Energies, vol. 14, issue 20, October 2021, https://doi.org/10.3390/en14206813.

Recent major awards:

1. 2016 IEEE Herman Halperin award. Award description "For nearly a century, the IEEE Awards Program has paid tribute to technical professionals whose exceptional achievements and outstanding contributions have made a lasting impact on technology, society, and the engineering profession. Each year the IEEE Awards Board recommends a select group of recipients to receive IEEE's most prestigious honors".
2. 2016 Association of Professional Engineers in the Province of Ontario, Canada; Medal of Honour for Engineering Excellence.
3. 2018 IEEE Roy Billinton Award in Power System Reliability. (Dr. Anders is the only person who received IEEE highest awards in two different power system disciplines).
4. 2019 Power Engineering Society of IEEE Prize Paper Award.

Keywords:
Electric power cables, ampacity calculations, mathematical modelling.

List of internship proposal in this research team:

Accepting PhD candidates from industry and academia.