

## LED Intensity Measurement (Case Study)

### Challenge

In a recent application our customers needed to test LEDs in commercial traffic lights. The traffic light consisted of an array of 120 high power red LEDs. The traffic light operated in a high intensity mode called "stop mode" and a low intensity mode called "roll mode".

When the LEDs were in "stop mode" their measurement system would activate.

In order to commission this, several dummy lights were used to verify the LED intensity by a level acceptable to the test system. However, when operated in "roll mode", the commissioning of the central dummy lights caused inconsistency in the measurement of LED colour and intensity.

### Solution

The solution was to use the Flux LED Analyser in conjunction with Flux Optical

Modules. The Flux LED Analyser has an extremely wide dynamic range which allows it to test LEDs from the dimmest LED (0.1 mcd) to the brightest LED, without the use of any external optical attenuators or filters (at least 200 lumens). The Flux OMF LED Analyser was connected together in a daisy chain configuration in order to test 120 LEDs simultaneously.

In this particular case the customer opted to use the XP chromaticity and intensity outputs from the Flux LED Analyser. Flux provided a comprehensive suite of software tools which allowed us adjust the Flux LED Analyser after it was fixed in the test fixture. This allowed that each time we measured the central intensity and colour. By using the most advanced colour technology it was possible to achieve a repeatability of  $\pm 0.0001$  in CIE x and y chromaticity and a repeatability of  $\pm 1%$  in terms of intensity measurements with a linear relation between it and full scale.

One of the biggest challenges when setting up this test fixture was determining the test fixture layout. It was decided that the best method was to test a large quantity of PCBs and using the measurement to calculate the mean and standard deviation of each PCB position. Two tests were determined using the mean values as measured by the Flux LED Analyser and the MinMax software were derived from the relevant LED data sheet.

In order to ensure that the LEDs were thermally stable the LEDs were pre-warmed for a fixed time before any measurement was made.

### Result

Using the Flux balancing software it was then possible to adjust the mean intensity value of each test component for any fixture variations. A golden thread (Mathematics Board) was stretched and the measured value for each filter was stored. This board was then used to verify the test fixture each day to ensure that there was no drift in the test results.

After drying of the test fixture the test time was approximately 1.5 seconds for the high intensity test and 1.0 seconds for the low intensity test of all 120 LEDs. The customer reported a new operational procedure from the Flux LED Analyser in terms of both colour and intensity measurement. See Flux Case Study below.

<http://www.flux.com>

# Led Intensity Measurement Case Study

**RS Peters**



## Led Intensity Measurement Case Study:

**Advanced water splitting technologies development: Best practices and protocols** Ellen B. Stechel, Kathy Ayers, Brendan Bulfin, Marcelo Carmo, Olga A. Marina, Roel Van de Krol, Chengxiang Xiang, Julie Mougin, 2023-04-04 [River Water Quality Model](#) P. Reichert, Dietrich Borchardt, Mogens Henze, Wolfgang Rauch, P. Shanahan, Laszlo Somlyódy, Peter A. Vanrolleghem, 2001-08-31 This Scientific and Technical Report STR presents the findings of the IWA Task Group on River Water Quality Modelling RWQM The task group was formed to create a scientific and technical base from which to formulate standardized consistent river water quality models and guidelines for their implementation This STR presents the first outcome in this effort River Water Quality Model No 1 RWQM1 As background to the development of River Water Quality Model No 1 the Task Group completed a critical evaluation of the current state of the practice in water quality modelling A major limitation in model formulation is the continued reliance on BOD as the primary state variable despite the fact BOD does not include all biodegradable matter A related difficulty is the poor representation of benthic flux terms As a result of these limitations it is impossible to close mass balances completely in most existing models These various limitations in current river water quality models impair their predictive ability in situations of marked changes in a river's pollutant load streamflow morphometry or other basic characteristics RWQM 1 is intended to serve as a framework for river water quality models that overcome these deficiencies in traditional water quality models and most particularly the failure to close mass balances between the water column and sediment To these ends the model incorporates fundamental water quality components and processes to characterise carbon oxygen nitrogen and phosphorus C O N and P cycling instead of biochemical oxygen demand as used in traditional models The model is presented in terms of process and components represented via a Petersen stoichiometry matrix the same approach used for the IWA Activated Sludge Models The full RWQM1 includes 24 components and 30 processes The report provides detailed examples on reducing the numbers of components and processes to fit specific water quality problems Thus the model provides a framework for both complicated and simplified models Detailed explanations of the model components process equations stoichiometric parameters and kinetic parameters are provided as are example parameter values and two case studies The STR is intended to launch a participatory process of model development application and refinement RWQM1 provides a framework for this process but the goal of the Task Group is to involve water quality professionals worldwide in the continued work developing a new water quality modelling approach This text will be an invaluable reference for researchers and graduate students specializing in water resources hydrology water quality or environmental modelling in departments of environmental engineering natural resources civil engineering chemical engineering environmental sciences and ecology Water resources engineers water quality engineers and technical specialists in environmental consultancy government agencies or regulated industries will also value this critical assessment of the state of practice in water quality modelling Key Features presents a unique new

technical approach to river water quality modelling provides a detailed technical presentation of the RWQM1 water quality process model gives an informative critical evaluation of the state of the practice in water quality modelling and problems with those practices provides a step by step procedure to develop a water quality model Scientific Technical Report No 12

Bridge Maintenance, Safety, Management and Life Extension Airong Chen, Dan Frangopol, Xin Ruan, 2014-05-27 Bridge Maintenance Safety Management and Life Extension contains the lectures and papers presented at IABMAS 2014 the Seventh International Conference on Bridge Maintenance Safety and Management IABMAS 2014 held in Shanghai China July 7 11 2014 This set consists of a book of abstracts and a DVD containing the full papers of 396 contributions presented at IABMAS 2014 including the T Y Lin Lecture nine Keynote Lectures and 386 technical papers from about 40 countries All major aspects of bridge maintenance safety management and life extension are addressed including advanced materials aging of bridges assessment and evaluation bridge codes bridge diagnostics bridge management systems damage identification design for durability deterioration modeling earthquake and accidental loadings fatigue field testing health monitoring load models life cycle assessment maintenance strategies non destructive testing prediction of future traffic demands repair and replacement residual service life safety and serviceability service life prediction and sustainable bridges among others This set provides an up to date overview of the field of bridge engineering as well as the recent significant contributions to the process of making rational decisions in bridge maintenance safety management sustainability monitoring long life strategy and resources optimization deployment for the purpose of enhancing the welfare of society It will serve as a valuable reference to all concerned with bridge structure and infrastructure systems including students researchers engineers consultants and contractors from all areas of bridge engineering

**Bioconversion and Biorefinery of C1 Compounds** Guodong Luan, Eun Yeol Lee, Fu-Li Li, Yu Wang, Pramod P. Wangikar, Michael Thomas Guarnieri, 2021-12-31

Control Theory for Physicists John Bechhoefer, 2021-04-01 Control theory an interdisciplinary concept dealing with the behaviour of dynamical systems is an important but often overlooked aspect of physics This is the first broad and complete treatment of the topic tailored for physicists one which goes from the basics right through to the most recent advances Simple examples develop a deep understanding and intuition for the systematic principles of control theory beyond the recipes given in standard engineering focused texts Up to date coverage of control of networks and complex systems and a thorough discussion of the fundamental limits of control including the limitations placed by causality information theory and thermodynamics are included In addition it explores important recent advances in stochastic thermodynamics on the thermodynamic costs of information processing and control For all students of physics interested in control theory this classroom tested comprehensive approach to the topic with online solutions and further materials delivers both fundamental principles and current developments

**Naval Research Logistics**, 2006 Proceedings of the Royal Society of London

Royal Society (Great Britain), 1925 Publishes research papers in the mathematical and physical sciences Continued by

Proceedings Mathematical and physical sciences and Proceedings Mathematical physical and engineering sciences

Manual of Environmental Management Adrian Belcham, 2014-09-25 Manual of Environmental Management is a practical guide for those involved in the control and reduction of environmental impacts in organisations This comprehensive and practical guide takes you through the main environmental challenges organisations face and the improvement strategies used to manage them Chapter by chapter Manual of Environmental Management discusses the fundamental issues and principles surrounding environmental policy law and management and provides crucial information on how to respond and implement environmental programmes This book is the perfect reference tool for the environmental professional and an invaluable study text for those preparing for professional examinations such as the NEBOSH Environmental Diploma and IEMA Associate Membership Exam

*A First Study of the Statistics of Insanity and the Inheritance of the Insane Diathesis* David Heron, 1907

Transitions in Nursing Esther Chang, John Daly, 2015-08-28 Now in its fourth edition Chang and Daly's Transitions in Nursing continues to offer fresh insights and discussions around the issues and challenges faced by senior nursing students when making the transition to nursing practice Transitions in Nursing 4th Edition is divided into three sections that reflect the transitional changes common to nursing students Section 1 From Student to Graduate Section 2 Skills for Dealing with the World of Work Section 3 Organisational Environments Featuring contributions from a range of leading academics and clinicians Chang and Daly's Transitions in Nursing 4th Edition provides students with a number of strategies that can be tested and applied in practice Its accessible and practical approach will appeal to nursing students while offering a valuable resource for practising nurses nurse educators and administrators Chang and Daly's Transitions in Nursing 4th Edition will continue to challenge motivate and support all nursing students as they transition to practising registered nurses Chang and Daly's highly respected text assists students when preparing for their first nursing role by addressing key issues such as Team work Organisational culture Stress management Communication skills Professional development strategies Self care NEW chapters Evidence based practice knowledge translation a practical guide Establishing and maintaining a professional identity portfolios and career progression Transition into practice the regulatory framework for nursing Stronger focus on organisational culture clinical reasoning conflict resolution skills and competencies and requirements of professional portfolios Updated Recommended Readings and revised Case Study Reflective Questions All chapters have been updated to reflect current practice

**Hamburg, a global city? A case study on Hamburg's producer services and cultural industries** Anna-Lena Prüser, 2018-11-15 Bachelor Thesis from the year 2015 in the subject Geography Earth Science Economic Geography grade 1.3 University of Twente language English abstract This bachelor thesis examines a city's interlinkage in the globalizing processes and aims at answering the research question To what extent can Hamburg be qualified as a Global City in terms of its localization of global producer services and cultural industries Global cities are defined as local nodes of the corporate service sector and the cultural economy which are

associated in a global network Following this an in depth analysis of Hamburg s performance on the economic and cultural dimension will be provided in order to clarify its global city status It will be innovative in two respects Firstly it will provide an incorporation of both dimensions economic and culture into its analysis in order to provide a more comprehensive and less biased estimate of a metropolis global city status a practice that has not been conducted in the literature so far Secondly it will apply this dualistic approach to the city of Hamburg Even though it is the second largest city in Germany according to population numbers Hamburg has not yet been subject of detailed investigation by global city researcher In a SWOT analysis the strength weaknesses opportunities and threats of the producer service sector and the cultural economy are outlined in order to determine their basic situation the sectors integration in the global networks are discussed mainly on basis of the Globalization and World Cities Studies Research Network GaWC dataset and the data generated by Kratke 2010 By linking the local conditions with the global perspective on both sectors the not fully developed functional status of Hamburg as a global city becomes clear it is a global city in the second row Derived from this finding recommendations for a better involvement in the global networks are provided Calibrated Network Measurement Joel Edward Sommers,2007

**Information Modelling and Knowledge Bases IX** P. J. Charrell,H. Jaakkola,H. Kangassalo,1998 Information modelling is the essential part of information system design Design methods specification languages and tools tend to become application dependent aiming at integration of methodologies stretching traditional database design to advanced knowledge bases and including use of logical languages and process oriented system description The topics of the articles in this book cover a wide variety of themes in the domain of information modelling specifications of information systems and knowledge bases ranging from foundations and theories to systems construction and application studies The contributions represent the following major themes the use of ontologies in knowledge modelling concept modelling and conceptual modelling database modelling applications of object oriented modelling view integration and consistency checking modelling multimedia and multimedia models design methods process modelling formal systems

**Productivity Measurement and Analysis** OECD,Federal Statistical Office,2009-05-12 Presents the proceedings of two workshops on productivity measurement and analysis which brought together representatives of statistical offices central banks and other officials involved with the analysis and measurement of productivity at aggregate and industry levels **The Time of Perception as a Measure of**

**Differences in Sensations** Vivian Allen Charles Henmon,1906 Human Resource Led Development? Jere R. Behrman,1990 Measurements of Twins Edward Lee Thorndike,1905 The Electrical Review ,1928 Telegraphic Journal and Monthly Illustrated Review of Electrical Science ,1928 Electricity ,1895

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