



UNIVERSITÀ
DEGLI STUDI
FIRENZE

FLORE

Repository istituzionale dell'Università degli Studi di Firenze

Ergonomics and sustainability in the design of everyday use products, in: Work, supplement 1/2012 "IEA 2012: 18th World

Questa è la Versione finale referata (Post print/Accepted manuscript) della seguente pubblicazione:

Original Citation:

Ergonomics and sustainability in the design of everyday use products, in: Work, supplement 1/2012 "IEA 2012: 18th World congress on Ergonomics - Designing a sustainable future" Editors Marcelo M. Soares and Karen Jacobs, IOS Press 2012 / F. Tosi. - In: WORK. - ISSN 1051-9815. - ELETTRONICO. - 1:(2012), pp. 3878-3882.

Availability:

The webpage <https://hdl.handle.net/2158/605527> of the repository was last updated on 2016-02-03T10:00:03Z

Terms of use:

Open Access

La pubblicazione è resa disponibile sotto le norme e i termini della licenza di deposito, secondo quanto stabilito dalla Policy per l'accesso aperto dell'Università degli Studi di Firenze (<https://www.sba.unifi.it/upload/policy-oa-2016-1.pdf>)

Publisher copyright claim:

La data sopra indicata si riferisce all'ultimo aggiornamento della scheda del Repository FloRe - The above-mentioned date refers to the last update of the record in the Institutional Repository FloRe

(Article begins on next page)

Books & Journals

New releases
Browse by subject
Books
Journals
Book Series



Home Catalogue Journals WORK

WORK

A Journal of Prevention, Assessment & Rehabilitation

IMPACT FACTOR 2015 **0.32**

ISSN print 1051-9815
ISSN online 1875-9270
Volume 53-55; 12 issues
Status Last issue (52:4) online on 05 January 2016
Next issue 53:1 scheduled for February 2016
Back volumes 1-52
Subject [Biochemistry, Medicine & Health](#) [Rehabilitation & Assistive Technology](#)

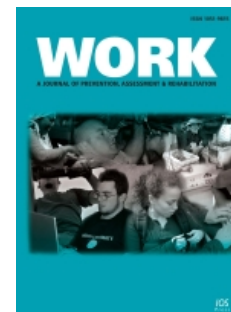
INSTITUTIONAL SUBSCRIPTION FOR 2016

€1000 / US\$1325

Excluding VAT

Subscribe

SHARE THIS JOURNAL



[Contents](#)

[Recommend this title to your librarian](#)

Twitter: [@WORK_Journal](#)

Celebrating Volume 50 of WORK: Special Issue on [Soldier Rehabilitation](#) now freely available online!

WORK/Canadian Institute for the Relief of Pain and Disability (CIRPD)

Listen Now: Podcasts Presented by WORK Editor-in-Chief Karen Jacobs

[Manager Involvement in Work Re-Integration?](#)

['Becoming Human Again': Exploring Connections Between Nature and Post-traumatic Distress for Veterans](#)

[Pulled from All Sides: The Sandwich Generation at Work](#)

[Productivity, Health, and Wellbeing from Working in Green Buildings: Can We Find Win-Win Solutions](#)

[Aims & Scope](#) [Editorial board](#) [Manuscript submission & Author instructions](#) [Abstracted/Indexed in](#) [News](#)

WORK: A Journal of Prevention, Assessment & Rehabilitation is an interdisciplinary, international journal which publishes high quality peer-reviewed manuscripts covering the entire scope of the occupation of work. The journal's subtitle has been deliberately laid out: The first goal is the prevention of illness, injury, and disability. When this goal is not achievable, the attention focuses on assessment to design client-centered intervention, rehabilitation, treatment, or controls that use scientific evidence to support best practice. *WORK* occasionally publishes thematic issues, but in general, issues cover a wide range of topics such as ergonomic considerations with children, youth and students, the challenges facing an aging workforce, workplace violence, injury management, performing artists, ergonomic product evaluations, and the awareness of the political, cultural, and environmental determinants of health related to work.

Dr. Karen Jacobs, the founding editor, and her editorial board especially encourage the publication of research studies, clinical practice, case study reports, as well as personal narratives and critical reflections of lived work experiences (autoethnographic/autobiographic scholarship), *Sounding Board* commentaries and *Speaking of Research* articles which provide the foundation for better understanding research to facilitate knowledge dissemination. *Narrative Reflections on Occupational Transitions*, a new column, is for persons who have successfully transitioned into, between, or out of occupations to tell their stories in a narrative form. With an internationally renowned editorial board, *WORK* maintains high standards in the evaluation and publication of manuscripts. All manuscripts are reviewed expeditiously and published in a timely manner. *WORK* prides itself on being an author-friendly journal.

WORK celebrates its 25th anniversary in 2015.

WORK is affiliated with the Canadian Association of Occupational Therapists (CAOT)

WORK is endorsed by the International Ergonomics Association (IEA)

WORK gives out the yearly Cheryl Bennett Best Paper Award

Preface

Karen Jacobs

*Founding Editor-in-Chief, **WORK**, Chairperson, IEA Science, Technology & Practice (STP), Occupational therapist & ergonomist, Boston University, Boston, MA, USA*

E-mail: kjacobs@bu.edu; Blog: <http://blogs.bu.edu/kjacobs/>

WORK: A Journal of Prevention, Assessment & Rehabilitation is honored to publish as a supplement, the Proceedings for the **18th Triennial International Ergonomics Association's (IEA) Congress. The theme of the Congress was *Designing a Sustainable Future***. We must all make a commitment to help design a sustainable future. As described on the Congress website;

“As a discipline which is involved in the designing of the interactions among humans and other elements of a system, ergonomics must consider “sustainability” as a key aspect in optimizing resources to improve human well-being and overall system performance. So, one of the major challenges in the field of ergonomics for the 21st Century will be the design and management of systems that satisfy custom demands in terms of the requirements for human compatibility and at the same time consider sustainability” (www.iea2012.org).

The Congress papers contained in this supplement are a global snap shot of the science-driven and evidence based research and scholarly work being conducted by practitioners, scientists, researchers, academicians, and students. All papers are indexed with DOI numbers so they can be easily accessed and will add to the growing body of evidence in ergonomics.

It has been my pleasure to be part of the IEA's Executive Committee and the Organizing Committee of this Congress during Dr. Andy Imada's term as President. Andy, thank you for your leadership. Congratulations to Professor Marcelo M. Soares, the Congress Chair, the Congress Organizing Committee, the IEA, the Brazilian Ergonomics Association and the Union of Latin-American Ergonomics Societies on a successful Congress.

With much admiration,

Karen Jacobs

Contents

Parallel Sessions

Area – Activity Theories for Work Analysis and Design

S-ATWAD 01 - Innovation and Health

New working conditions and consequences on activity of home healthcare workers

Corinne Van De Weerd and René Baratta 1

Innovation in the occupational health physician profession requires the development of a work collective to improve the efficiency of MSD prevention

S. Caroly, A. Landry, C. Cholez, P. Davezies, M. Bellemare and N. Poussin 5

Efficiency of personal protective equipment used in agriculture

Luiz Antônio Meirelles, Marcelo Motta Veiga and Francisco José de Castro Moura Duarte 14

The use of pesticides in French viticulture: a badly controlled technology transfer!

Garrigou Alain, Isabelle Baldi and Jackson Marçal 19

Can activity be understood out of subjectivity?

F. Hubault and L.I. Szelwar 26

S-ATWAD 02 - Innovation and Organization

Contributions of ergonomics to the construction of bus drivers health and excellence in public transport and at work

Claudio Brunoro, Laerte Idal Szelwar, Ivan Bolis and Julia Abrahão 30

The 193 call center, a meaningful public service!

Maud Eickhoff and Laerte Idal Szelwar 36

Organization of work in interaction between the paramedics and the patient <i>Petra Auvinen and Hannele Palukka</i>	42
Working in verticalized platform vessel: an ergonomic approach in the oil industry <i>Luciano Garotti and Fausto Mascia</i>	49
S-ATWAD 03 - Innovation and Production/Innovation and Risk	
Contributions from the activity analysis to the products development project: case study based on a project of innovation and comfort in aircraft's cabins <i>F.M. Greghi, N.T.Rossi, G.B.J. Souza and L.N. Menegon</i>	55
Design of educational artifacts as support to learning process <i>Adson Eduardo Resende and Flávio Henrique Vasconcelos</i>	61
Coordination and artifacts in joint activity: the case of tagging in high-risk industries <i>François Palaci, Geneviève Filippi and Pascal Salembier</i>	69
The process of constructing new competencies in the family agricultural production unit <i>Uiara Bandineli Montedo</i>	76
S-ATWAD 04 - Innovations: Conceptual Approaches	
Finding disturbances in on-farm biogas Production <i>Pereira-Querol Marco Antonio and Seppänen Laura</i>	81
Activity at work, innovation and sustainable development <i>P. Béguin, F. Duarte, F. Lima and V. Pueyo</i>	89
The concept of contradiction in ergonomics Practice <i>Dimitris Nathanael, Nikos Zarboutis and Nicolas Marmaras</i>	95
User-driven innovation of an outpatient department <i>Ole Broberg and Kasper Edwards</i>	101
Ergonomics in projects of oil platforms in a change context <i>Barbara Oggioni, Francisco Duarte and Cláudia Cordeiro</i>	107

S-ATWAD 05 - Innovation: Methods for Innovation and Activity at Work

Expanding uses of building information modeling in life-cycle construction projects <i>Kerosuo Hannele, Miettinen Reijo, Mäki Tarja, Paavola Sami, Korpela Jenni and Rantala Teija</i>	114
The use of participant-observation protocol in an industrial engineering research <i>Renato da Silveira e Silva, Laerte Idal Sznelwar and Victor D'Afonseca e Silva</i>	120
Intermediary objects in the workspace design process: means of experience transfer in the offshore sector <i>Carolina Conceição, Gislaine Silva, Ole Broberg and Francisco Duarte</i>	127
Work situation operative model MOST: linking diagnosis and intervention to improve work conditions <i>Karen Lange Morales, Gabriel García-Acosta, William Urueña-Téllez and Adriana Pérez</i>	136
The start up as a phase of architectural design process <i>Iara Sousa Castro, Francisco de Paula Antunes Lima and Francisco José de Castro Moura Duarte</i>	140
Area - Aerospace Human Factors and Ergonomics	
S-AHFE 01 - Human Factors and Ergonomics in Aerospace 1	
The realistic consideration of human factors in model based simulation tools for the air traffic control domain <i>Gabriella Duca and Erminia Attaianes</i>	145
Analysis of the work of air traffic controllers of the approach control area (APP) of Porto Alegre, Brazil <i>C.V. Vargas, L.B. de M. Guimarães and A.M.O. Sant'Anna</i>	151
Factor interaction influences on human performance in air traffic control: The need for a multifactorial model <i>Tamsyn Edwards, Sarah Sharples, John R. Wilson and Barry Kirwan</i>	159

Application of the user-centred design process according ISO 9241-210 in air traffic control <i>Christina König, Thomas Hofmann and Ralph Bruder</i>	167
Air accident investigation among regulatory agencies <i>Marcia Fajer and Frida Marina Fischer</i>	175
Manual flying skills under the influence of performance shaping factors <i>Andreas Haslbeck, Ekkehart Schubert, Linda Onnasch, Gerhard Hüttig, Heiner Bubb and Klaus Bengler</i>	178
S- AHFE 02 - Human Factors and Ergonomics in Aerospace 2	
Learning objects and training complex machines <i>Edgard Martins</i>	184
Application of diffusion maps to identify human factors of self-reported anomalies in aviation <i>Chris Andrzejczak, Waldemar Karwowski and Piotr Mikusinski</i>	188
Could mild hypoxia impair pilot decision making in emergencies? <i>Stephen Legg, Stephen Hill, Toby Mundel, Andrew Gilbey, Zac Schlader and Aaron Raman</i>	198
The application of waste management systems for long duration spaceflight <i>James M. Oglesby</i>	204
Achieving impact in ergonomic research <i>Nick McDonald, Marie Ward and Rabea Morrison</i>	209
S- AHFE 03 - Human Factors and Ergonomics in Aerospace 3	
The passing of the shift in aircraft maintenance - a task that produces deaths <i>Reginaldo Campos, Edgard Martins and Marcelo Soares</i>	219
Automation under suspicion – case flight AF-447 Air France <i>Edgard Martins and Marcelo Soares</i>	222
Preliminary study of the pilot’s workload during emergency procedures in helicopters air operations <i>Flávio G.V. Bezerra and Selma L.O. Ribeiro</i>	225

Modeling activities in air traffic control systems: antecedents and consequences of a mid-air collision <i>Paulo Victor R. de Carvalho and Bemildo Ferreira</i>	232
An approach to aircraft seat comfort using interface pressure mapping <i>Flavia Renata Dantas Alves Silva Ciaccia and Laerte Idal Szelwar</i>	240
Area – Affective Product Design	
S-APD 01 - Affective Product Design 1	
A first empirical investigation into the pleasure of control as explaining factor in usage durations of information systems <i>Michaela Kauer and Ralph Bruder</i>	246
Subjective and objective evaluation of sense of space for vehicle occupants based on anthropometric data <i>Pitarn Hiamtoe, Florian Steinhardt, Uwe Köhler and Klaus Bengler</i>	252
The effect of system aesthetics on trust, cooperation, satisfaction and annoyance in an imperfect automated system <i>Alona Weinstock, Tal Oron-Gilad and Yisrael Parmet</i>	258
The perception of fear when using urban furniture <i>Gabriela Pizzato, Lia Guimarães and Arlei Damo</i>	266
Personality of social robots perceived through the appearance <i>Benedict Tay Tiong Chee, Park Taezoon, Qianli Xu, Jamie Ng and Odelia Tan</i>	272
S-APD 02 - Affective Product Design 2	
Usability and the emotional relationships in collective buying sites: a case study <i>J.E. Silveira, T.P. Anjos and L.A. Gontijo</i>	277
The perception of pleasantness in a product of collective use: the bus shelter <i>Gabriela Pizzato, Lia Guimarães and Carla ten Caten</i>	282
Protection or pleasure: female footwear <i>Mariana Seferin and Júlio van der Linden</i>	290
Comfort model for automobile seat <i>Lizandra da Silva, Silvana Ligia Vincenzi Bortolotti, Izabel Carolina Martins Campos and Eugenio Andrés Díaz Merino</i>	295

Area – Aging**S-Aging 01 - Working Late**

Physical workload and thoughts of retirement
Merja Perkiö-Mäkelä and Maria Hirvonen 303

Ergonomics of bridge employment
Mokdad Mohamed 307

High work ability in the scientific activity of older and experienced academics
Ülo Kristjuhan and Erika Taidre 313

Work ability among nursing personnel in public hospitals and health centers in Campinas – Brazil
Inês Monteiro, Manuela de Santana Pi Chillida and Luciana Contrera Moreno 316

S-Aging 02 - Usage and usability

Mobile Phones and Elderly People: a noisy communication
Cláudia Stamato and Anamaria de Moraes 320

Application and analysis of the affinities diagram on the examination of usability problems among older adults
José Guilherme Santa-Rosa and Heloisa Fernandes 328

Development of guidelines for designing appliances for older persons
Peter G. Higgins and Adam Glasgow 333

Process of precocious functional aging in workers of laundries
Simone Caldas Tavares Mafra, Celina Angélica Lisboa Valente Carlos and Vania Eugênia da Silva 340

S-Aging 03 – Telemedicine

A usability gap between older adults and younger adults on interface design of an Internet-based telemedicine system
Young J. Chun and Patrick E. Patterson 349

A suggestion for future research on interface design of an internet-based telemedicine system for the elderly
Young J. Chun and Patrick E. Patterson 353

The relevance of temporal iconicity with instruction manuals for elderly users <i>Alexander Mertens, Claudia Nick, Stefan Krüger and Christopher M. Schlick</i>	357
Elderly-technology interaction: accessibility and acceptability of technological devices promoting motor and cognitive training <i>Tiziana C. Callari, Silvia Ciairano and Alessandra Re</i>	362
Age differences and transfer on control solution testing with blood glucometers <i>Christopher B. Mayhorn and Eric D. Carpenter</i>	370
S-Aging 04 – Age and work capacity	
Universal design and accessibility: an approach of the influence of muscle strength loss in the risk of falls in the elderly <i>P. Reis, A. Moro, V. Bins Ely, C. Fernandes, J. Vilagra, L. Peres, O. Fogaça Junior and Eugenio Merino</i>	374
Ergonomics as a tool in prolonging youth and postponing ageing <i>Ülo Kristjuhan</i>	380
An ergonomic approach to improve work conditions of older employees in social housing <i>Sylvain Biquand and Nadia Heddad</i>	383
Area – Ergonomics Analysis of Work and Training	
S-EAWT 01 – Physical Demand at Work 1	
A polynomial equation to predict low back compression force: accounting for the effects of load height on instability <i>Inger Christina Calder and Jim R. Potvin</i>	388
Interaction between employees' physical load factors and early support at the workplace <i>Simo Kaleva, Johanna Turja, Marketta Kivistö and Jorma Seitsamo</i>	394
An equation to predict maximum acceptable loads for repetitive tasks based on duty cycle: evaluation with lifting and lowering tasks <i>Jim R. Potvin</i>	397

Ergonomic intervention in <i>Aonla</i> pricking operation during preserve preparation in food processing industries <i>Arpana Rai, Sudesh Gandhi, Nitin Kumar, D.K. Sharma and M.K. Garg</i>	401
S-EAWT 02 – Physical Demand at Work 2	
Assessment of physical workload in boiler operations <i>Valéria Antônia Justino Rodrigues, Camila Soares Braga, Julio César Costa Campos, Amaury Paulo de Souza, Luciano José Minette, Guilherme Luciano Sensato, Angelo Casali de Moraes and Emilia Pio da Silva</i>	406
Physical demands during the hauling of fishing nets for artisan fishing using rafts in beach of Ponta Negra, Natal-Brasil <i>Anelena Jaeschke and Maria Christine Werba Saldanha</i>	414
The effects of functional limitations on soldier common tasks <i>John R. Bacon, Thomas J. Armstrong and Teresa L. Brininger</i>	422
Physical workload during firefighting in Chilean volunteers <i>Javier A. Freire Herrera, Felipe E. Meyer Cohen and Elías S. Apud Simón</i>	432
S-EAWT 03 – Physical Demand at Work 3	
The Cognitive Ergonomics and the Articulation of the Functions of Industrial Products <i>Sabrina Talita Oliveira and Adriano Heemann</i>	437
Physiological stress assessment of female workers at kitchen workstation <i>Hema Bhatt and M.K. Sidhu</i>	441
Level of self-reported neck/shoulder pain and biomechanical workload in cleaners <i>Pascal Madeleine, Karen Søgaard, Andreas Holtermann and Afshin Samani</i>	447
Workers' postural conditions in the charcoal production process based on vertical metallic cylinders <i>Ivana Márcia Oliveira Maia and Antonio Carlos de Francisco</i>	453

Heavy physical work under time pressure: the garbage collection service- a case study <i>Ilza Mitsuko de Oliveira Camada, Silvana Maria Santos Pataro and Rita de Cássia Pereira Fernandes</i>	462
Evaluation of thermal overload in boiler operators <i>Camila Soares Braga, Valéria Antônia Justino Rodrigues, Julio César Costa Campos, Amaury Paulo de Souza, Luciano José Minette, Angêlo Casali de Moraes and Guilherme Luciano Sensato</i>	470
S-EAWT 04 – Ergonomic Assessment at Work 1	
Is there enough information to calculate the financial benefits of ergonomics projects? <i>M. Pereira da Silva, C. Pruffer and F.G. Amaral</i>	476
Evaluating the effectiveness of ergonomics application <i>J.N. Ugbebor and S.S. Adaramola</i>	484
Evidence-based ergonomics: a model and conceptual structure proposal <i>Dierci Marcio Silveira</i>	487
Ergonomic evaluation of a situation of coexposure to solvents and noise in a printing of flexible packaging <i>A. Mhamdi, A. Ben Amor, A. Amri, I. Youssef, N. Ladhari and R. Gharbi</i>	496
The utilization of infrared imaging for occupational disease study in industrial work <i>Marcos Leal Brioschi, Maria Lúcia Leite Ribeiro Okimoto and José Viriato Coelho Vargas</i>	503
S-EAWT 05 – Ergonomic Assessment at Work 2	
Three years of the OCRA methodology in Brazil: critical analysis and results <i>Facci Ruddy, Marcatto Eduardo and Santino Edoardo</i>	510
Correlation of ergonomic risk factors with RULA in IT professionals from India <i>Deepak Sharan and P.S. Ajeesh</i>	512
Remote online ergonomic assessment in the office environment as compared to face-to-face ergonomic assessment <i>Levy Eyal, Joseph Ribak and Yehuda Badihi</i>	516

Performance indicators of work activity <i>Manoela de Assis Lahoz and João Alberto Camarotto</i>	524
Evaluation and control of ergonomics actions in federal public service: the case of FIOCRUZ - RJ <i>Simone L. Santa Isabel Ricart, Mario Cesar Rodriguez Vidal and Renato José Bonfatti</i>	532
Analysing domestic activity to reduce household energy consumption <i>Myriam Fréjus and Julien Guibourdenche</i>	539
S-EAWT 06 – Methods for Ergonomic at Work	
Ergonomic analysis jobs in recovered factories <i>Gabriela Cuenca and Gastón Zotta</i>	549
From ergonomics to design specifications: contributions to the design of a processing machine in a tire company <i>A.S.P. Moraes, P.M. Arezes and R. Vasconcelos</i>	552
Assesment of managerial behavior in the correction of ergonomic problems at an Airport <i>Anderson N. Lima and Valéria B. Gomes</i>	560
Ergonomic considerations for a systemic approach: the millenium maize mills project in northern Mozambique <i>Ana Couvinhas, Patricia Ferrara, Denis Coelho, Sinezia Jorge and Jake Walter</i>	568
Forensics ergonomics in Spain. Research priorities by the Delphi technique <i>F.J. Llanea Alvarez, G. Rosal Lopez, Elsa Peña Suarez and J. Rodriguez Suarez</i>	576
Promoting ergonomics in Algeria: Activities of “the research and training laboratory” in the University of Oran <i>Bouhafs Mebarki and Tebboune Cheikh El-Bachir</i>	584
S-EAWT 07 – Manual Material Handling	
Training in manual material handling: what is going on in the field? <i>Veerle Hermans, Griet De Preter and Tine Verschueren</i>	588

Ergonomic assessment methodologies in manual handling of loads – opportunities in organizations <i>Claudia Pires</i>	592
The manual transport of load and the commercial aviation in Brazil <i>Carlos André Vaz</i>	597
Quantification of hand grasp force using a pressure mapping system <i>Jon W. Nicholas, Russel J. Corvese, Charles Woolley and Thomas J. Armstrong</i>	605
S-EAWT 08 – Evaluating the Human Activity	
Human activity reference database <i>C.P. Guimarães, G.L. Cid, V.S. Santos, M.C.P. Zamberlan, F.C.H. Pastura, G.M.D. Abud, C. Lessa, D.S. Batista and M.M. Fraga</i>	613
Cognitive chrono-ethnography lite <i>Masato Nakajima, Kosuke C. Yamada and Muneo Kitajima</i>	617
Ergonomics principles to design clothing work for electrical workers in Colombia <i>Juan Castillo and A. Cubillos</i>	623
The construction of ergonomic demands: application on artisan fishing using jangada fishing rafts in the beach of Ponta Negra <i>Maria Christine Werba Saldanha, Ricardo José Matos de Carvalho, Larissa Praça de Oliveira, Joyce Elanne Mateus Celestino, Isis Tatiane de Barros Macêdo Veloso and Anelena Jaeschke</i>	628
Ergonomic tridimensional analysis: critical ergonomic factors identification in a commercial environmental <i>I.F. Loureiro, C.P. Leão and P.M. Arezes</i>	636
Science as a service: understanding successful knowledge transfer in a New Zealand research institute <i>D. Moore, K. Bayne and T. Barnard</i>	642

S-EAWT 09 – Ergonomic Evaluation of Workstations 1

Ergonomics and environmental sustainability: a case study of raft fisherman activity at Ponta Negra Beach, Natal-RN
Joyce Elanne Mateus Celestino, Cristina de Souza Bispo, Maria Christine Werba Saldanha and Karen Maria da Costa Mattos 648

Maintenance of submersible pumps in the septic tanks: ergonomic and biological risks to the worker
Suzi Mariño and Alex Figueiredo 656

Development of an instrument for assessing workstyle in checkout cashier work (BAsIK)
Katarina Kjellberg, Peter Palm and Malin Josephson 663

S-EAWT 10 – Ergonomic Evaluation of Workstations 2

Multi dimensional system for evaluating preventive program for upper extremity disorders among computer operators
Yafa Levanon, Amit Gefen, Yehuda Lerman, Uri Givon and Navah Z. Ratzon 669

Support of the upper limbs of office workers during a daily work journey
Ernesto Filgueiras, Francisco Rebelo and Moreira da Silva 676

Situated modelling in the drawing workshop for bobbin lace
Maria Christine Werba Saldanhar and Juliana Donato de Almeida 683

Ergonomics work analysis applied to dentistry - a Brazilian case study
R.A.R. Custódio, C.E.S. Silva and J.G.T. Brandão 690

The overload at work and outside of work: the case of woman operators of blistering
Raoni Rocha Simões and Vitor Guilherme Carneiro Figueiredo 698

Ergonomics analysis of the activity of boning shoulder in a pig slaughter-house in the city of Ipiranga-SC
Lizandra Garcia Lupi Vergara and Thais Regina Pansera 703

Ergonomic evaluation in a values transportation company in Venezuela
Evelin Escalona, Maylem Hernández, Yanes E. Lucia, Laura Yanes and Leopoldo Yanes 710

S-EAWT 11 – Ergonomics in Complex Systems 1

- Investigation of the impact of main control room digitalization on operators cognitive reliability in nuclear power plants
Yong Zhou, HaiYing Mu, Jianjun Jiang and Li Zhang 714
- Competing values, tensions and trade-offs in management of nuclear power plants
Teemu Reiman and Carl Rollenhagen 722
- The contribution of ergonomics to risk analysis in the design process: the case of a future control room
Cecilia De la Garza, Jean-Paul Labarthe and Louis Graglia 730
- From needs to requirements for computer systems: the added value of ergonomics in needs analysis
Stanislas Couix, Françoise Darses and Cecilia De-La-Garza 737

S-EAWT 12 – Ergonomics in Complex Systems 2

- New procedures of ergonomics design in a large oil company
Cynthia Mossé Alhadeff, Rosana Fernandes da Silva and Márcia Sales dos Reis 745
- Human factors engineering in oil and gas - a review of industry guidance
Martin Robb and Gerald Miller 752
- Ergonomics in designing process: dialogue between designers, executors and users in the maintenance activity of radars in an oil refinery
Fabício Augusto Menegon, Daniela da Silva Rodrigues, Andréa Regina Martins Fontes and Nilton Luiz Menegon 763
- Analysis of the implementation of ergonomic design at the new units of an oil refinery
Carolina Reich Marcon Passero, Érika Lye Ogasawara, Lucy Mara Silva Baú, Sandro Artur Buso and Marcos Cesar Bianchi 770
- The emergency system for the town of Milano: evaluation of an help point
Isabella Tiziana Steffan 774

S-EAWT 13 – Ergonomics at Health and Public Activity

Assessment of work ability of health professionals in the mobile emergency unit

Y. Santos, F. Porto, L. Marques, A. Tomaz, R. Toledo and N. Lucena

778

Taking care of you and care for others: an analysis of the activity of the work of technical and nursing assistants of a psychiatric institution for children and adolescents

Davidson Passos Mendes, Geraldo Fabiano de Souza Moraes and Juliana Cristina de Lima Mendes

783

Designing the safety of healthcare. Participation of ergonomics to the design of cooperative systems in radiotherapy

Maria Isabel Munoz, Nadia Bouldi, Flore Barcellini and Adelaide Nascimento

790

S-EAWT 14 – Methods for Ergonomic at Work

Conceptual design pattern for ergonomic workplaces

Bernardo Bastosa Fonseca, Maria Victoria Carbrera Aguilera and Mario Cesar Rodriguez Vidal

797

Participatory ergonomics and design of technical assistance

Claudia Isabel Rojas Rodriguez

804

Effects of early support intervention on workplace ergonomics – a two-year followup study

Johanna Turja, Simo Kaleva, Marketta Kivistö and Jorma Seitsamo

809

A multi-ontology view of ergonomics: applying the Cynefin Framework to improve theory and practice

Wendy Elford

812

How do people differentiate between jobs: and how do they define a good job?

Wendy Jones, Roger Haslam and Cheryl Haslam

818

Area – Ergonomics for Children and Educational Environments

S-ECED 01 - Children, Technology & the Environment

Usability testing with children: an application of Pedactice and Ticese methods

Alessandra Carusi and Cláudia Mont'Alvão

822

Ergonomic evaluation of postural stress in school workshop <i>Adila Md Hashim, Siti Zawiah Md Dawal and Nukman Yusoff</i>	827
Usability issues in Learning Management Systems (LMS) <i>Maria Isabella de Porto Alegre Muniz and Anamaria de Moraes</i>	832
S-ECED 02 - Children's Computer Use	
A proposed model representing the relationships between user characteristics, computer exposure and musculoskeletal symptoms in children <i>C. Harris, L. Straker, A. Smith and C. Pollock</i>	838
Children computer mouse use and anthropometry <i>Erin E. Hughes and Peter W. Johnson</i>	846
Promoting healthy computer use among middle school students: a pilot school-based health promotion program <i>Marina Ciccarelli, Linda Portsmouth, Courtenay Harris and Karen Jacobs</i>	851
An ergonomic study on the biomechanical consequences in children, generated by the use of computers at school <i>Claudia Paraizo and Anamaria de Moraes</i>	857
Primary school children's knowledge of, and attitudes towards, healthy computer use <i>T. Tran and M. Ciccarelli</i>	863
S-ECED 03 – Potpourri I: Ergonomics with Children, Youth and College Students	
Do teachers believe they are competent to promote healthy ICT use among their students? <i>R. Zlamanski and M. Ciccarelli</i>	869
Postural assessment of school children: an input for the design of furniture <i>Maria Antónia Gonçalves and Pedro M. Arezes</i>	876
Post occupancy evaluation of primary schools in Saudi Arabia <i>Sana Omari and Andree Woodcock</i>	881
Analysis of teacher's workspace in a child care center <i>Vera Helena Moro Bins Ely, Vanessa Dorneles, Flávia Martini Ramos and Mariana Moraes Luiz</i>	888

Educational workload and its psychophysiological impact on student organism <i>Oleksandr Burov and Oleksandra Tsarik</i>	896
S-ECED 04 - Important Ergonomic Issues with Children	
Backpacks and school children's obesity: challenges for public health and ergonomics <i>A.J.F. De Paula, J.C.P. Silva, L.C. Paschoarelli and J.B. Fujii</i>	900
Anthropometric aspects of body seated in school <i>P. Reis, A.R. Moro, J. Da Silva, L. Paschoarelli, F. Nunes Sobrinho and L. Peres</i>	907
The use software ERGOSHOW in the education of health and safety at work to regardin the safety to children <i>Sharinna Venturim Zanuncio, Simone Caldas Tavares Mafra, Francisco Rebelo and Ernesto Filgueiras</i>	915
Effects of a school based exercise program on children's resistance and flexibility <i>R.F.C. Moreira, F.H. Akagi, P.Y.L. Wun, C.S. Moriguchi and T.O. Sato</i>	922
Back pack injuries in Indian school children: risk factors and clinical presentations <i>Deepak Sharan, P.S. Ajeesh, Jerrish A. Jose, Sukrit Debnath and M. Manjula</i>	929
Children and teenagers working in artistic labor: Brazilian situation and international examples <i>S.R. Cavalcante and R.A.V. Vilela</i>	933
Area – Ergonomics in Design	
S-EinD 01 - Methods for the Ergonomic Design	
Embedded systems engineering for products and services design <i>Tareq Z. Ahram, Waldemar Karwowski, Marcelo M. Soares</i>	941
Integrating ergonomics in design processes: a case study within an engineering consultancy firm <i>Lene Bjerg Sørensen and Ole Broberg</i>	949

Questionnaire survey of customer satisfaction for product categories towards certification of ergonomic quality in design <i>Masaaki Mochimaru, Miwako Takahashi, Nobuko Hatakenaka and Hitoshi Horiuchi</i>	956
Product functions: interfaces with ergonomic design <i>Livia F. de A. Campos, Jamille N. de L. Lanutti and Luis Carlos Paschoarelli</i>	960
Kaizen and ergonomics: the perfect marriage <i>Martin Antonio Rodriguez and Luis Fernando Lopez</i>	964
Similar methodological analysis involving the user experience <i>Caio Márcio Almeida e Silva, Maria Lúcia R.L. Okimoto and Raffaella Leane Zenni Tanure</i>	968
S-EinD 02 - Ergonomics and User-Centered Design	
Designing with users to meet people needs: a teaching model <i>Laura Anselmi, Marita Canina and Elisabetta Coccioni</i>	976
The importance of User Centered Design methods applied to the design of a new workstation: a case study <i>Ronaldo Duschenes, Andressa Mendes, Adriana Betiol and Suzana Barreto</i>	984
The amount of ergonomics and user involvement in 151 design processes <i>Barbara N.E. Kok, Karin Slegers and Peter Vink</i>	989
VoiceYourView: anytime, anyplace, anywhere user participation <i>Andree Woodcock, Katerina Frankova and Laurence Garton</i>	997
A methodology for connecting User Centered Design (UCD) with Eco-design. The possibility of migration of products to services based on the user acceptance <i>Rodea Chávez Alejandro and Lucila Mercado Colin</i>	1004
S-EinD 03 – Ergonomics and Design for Usability 1	
Design for Usability; practice-oriented research for user-centered product design <i>Daan van Eijk, Jasper van Kuijk, Frederik Hoolhorst, Chajoong Kim, Christelle Harkema and Steven Dorrestijn</i>	1008

The inclusion of ergonomic tools in the informational, conceptual and preliminary phases of the product design methodology <i>Ivan Luiz de Medeiros and Eduardo Concepción Batiz</i>	1016
Ergonomics and usability of children interfaces: <i>Spore®</i> , the case study <i>Adriana Chammas, Anamaria de Moraes and Eduardo Ariel Teixeira</i>	1024
A children, teachers and designers as evaluators of usability of educational software <i>Luciana Freire, Marcelo Soares and Stephania Padovani</i>	1032
A literature review about usability evaluation methods for e-learning platforms <i>Luciana Lopes Freire, Pedro Miguel Arezes and José Creissac Campos</i>	1038
S-EinD 04 – Ergonomics and Design for Usability 2	
Usability in Product Design - The importance and need for systematic assessment models in product development – Usa-Design Model (U-D) © <i>Giselle Schmidt Alves Díaz Merino, Clarissa Stefani Teixeira, Rodrigo Petry Schoenardie, Eugenio Andrés Díaz Merino and Leila Amaral Gontijo</i>	1045
Common criteria for usability review <i>Victor Nassar</i>	1053
Usability analysis of industrial cooking equipment <i>Alexana Vilar Soares Calado and Marcelo Márcio Soares</i>	1058
The methodological involvement of the emotional design and cognitive ergonomics as a tool in the development of children products <i>Walter Correia, Laís Rodrigues, Fábio Campos, Marcelo Soares and Marina Barros</i>	1066
S-EinD 05 – Ergonomics and Emotional Design	
Emotion and interior space design: an ergonomic perspective <i>Swathi Matta Reddy, Debkumar Chakrabarti and Sougata Karmakar</i>	1072
Aesthetic taste versus utility: the emotional and rational of the individual <i>Claudia Mourthé and Pierre-Henri Dejean</i>	1079

Infant feeding: the interfaces between interaction design and cognitive ergonomics in user-centered design <i>Flavia Lima and Lilian Kely Araújo</i>	1086
Product evaluation based in the association between intuition and tasks <i>Caio Márcio Almeida e Silva, Maria Lúcia L.R. Okimoto, Deise Albertazzi, Cyntia Calixto and Humberto Costa</i>	1094
Design of experiment with emphasis on intuitive use <i>Caio Márcio Almeida e Silva and Maria Lúcia R.L. Okimoto</i>	1100
Design for reflection <i>Sebastiano Bagnara and Simone Pozzi</i>	1108
S-EinD 06 – Ergonomics and Digital Design	
Evaluating insole design with joint motion, plantar pressure and rating of perceived exertion measures <i>Yu-Chi Lee, Gloria Lin and Mao-Jiun J. Wang</i>	1114
A mind in a disk: the attribution of mental states to technological systems <i>Oronzo Parlangei, Tommaso Chiantini and Stefano Guidi</i>	1118
User's demography and expectation regarding search, purchase and evaluation in mobile application store <i>Wilson Prata, Anamaria de Moraes and Manuela Quaresma</i>	1124
Exploring the requirements for multimodal interaction for mobile devices in an end-to-end journey context <i>Claudia Krehl and Sarah Sharples</i>	1132
The ergonomic evaluation of a virtual learning environment usability <i>Aliana Pereira Simões and Anamaria de Moraes</i>	1140
S-EinD 07 - Ergonomics and the Virtual World	
Risk factors and clinical features of text message injuries <i>Deepak Sharan and P.S. Ajeesh</i>	1145
Using environmental affordances to direct people natural movement indoors <i>Elisângela Vilar, Luís Teixeira, Francisco Rebelo, Paulo Noriega and Júlia Teles</i>	1149

Participatory design in the project of virtual learning environment of histology <i>José Guilherme Santa-Rosa</i>	1157
Developing an usability test to evaluate the use of augmented reality to improve the first interaction with a product <i>Deise Albertazzi, Maria Lucia Okimoto and Marcelo Gitirana Gomes Ferreira</i>	1160
Use of augmented reality in the usability evaluation of products <i>Fernanda Faust, Giorgia Roepke, Tiago Catecati, Fernanda Araujo, Marcelo Gitirana Gome Ferreira and Deise Albertazzi</i>	1164
How to reduce workload – augmented reality to ease the work of air traffic controllers <i>Thomas Hofmann, Christina König, Ralph Bruder and Jörg Bergner</i>	1168
S-EinD 08 – Ergonomic Evaluation on Product Design 1	
Ergonomic evaluation of novel tool for snap-off the neck of ampoule <i>Bor-Shong Liu, Jun-Ting Lee and Ching-Wen Lien</i>	1174
Product perception from sensory stimuli: the case of vacuum cleaner <i>Caio Márcio Almeida e Silva, Maria Lúcia R.L. Okimoto and Raffaella Leane Zenni Tanure</i>	1178
The technological obsolescence of the Brazilian eletronic ballot box <i>Carlos Rogério Camargo, Richard Faust, Eugênio Merino and Clarissa Stefani</i>	1185
Designing an ergonomics backpack for student aged 7-9 with user centred design approach <i>Mahdie Amiri, Mohsen Safar Dezfooli and Seyed Reza Mortezaei</i>	1193
The role of usability in the evaluation of accidents: human error or design flaw? <i>Walter Correia, Marcelo Soares, Marina Barros and Fábio Campos</i>	1202
Exergames: the role of ergonomics and design in helping to control childhood obesity through physical and functional exercise program <i>Marina Barros, André Neves, Walter Correia and Marcelo Soares</i>	1208

S-EinD 09 – Ergonomic Evaluation on Product Design 2

- End users “Feedback” to improve ergonomic design of machinery
*F. Strambi, M. Bartalini, S. Boy, R. Gauthy, R. Landozzi,
 D. Novelli and C. Stanzani* 1212
- Comfort aspects important for the performance and safety of kitesurfing
Lina Lundgren, Sofia Brorsson and Anna-Lisa Osvalder 1221
- A bus stop shelter evaluated from the user’s perspective
*Vera Helena Moro Bins Ely, Jonara Machado de Oliveira and
 Louise Logsdon* 1226
- Ergonomic basket design to reduce cumulative trauma disorders in tea
 leaf plucking operation
N. Bhattacharyya and D. Chakrabarti 1234
- Ergonomic evaluation of conventional and improved methods of *Aonla*
 pricking with women workers
Arpana Rai, Sudesh Gandhi and D.K. Sharma 1239
- Design and technology in the development of potters’ lathes for modeling
 with terracota: the case of Cabo de Santo Agostinho
*G.D.A. Silva, E.D. Cordeiro, A.C.R. Silva, A.Q. Andrade and
 V.P. Cavalcanti* 1246

S-EinD 10 Ergonomics and Fashion Design

- The conception of fashion products for children: reflections on safety
 parameters
*Ligia Gomes Pereira Prete, Lucimar de Fátima Bilmaia Emidio
 and Suzana Barreto Martins* 1252
- Ergonomics analysis of the productive environment of fashion clothing
 firm in Belo Horizonte- MG
Andreia Salvan Pagnan and Jairo José Drummond Câmara 1261

S-EinD 11 – Physical Demand on Ergonomic Design 1

- Research on the relationship between the structural properties of bedding
 layer in spring mattress and sleep quality
*Liming Shen, Yu-xia Chen, Yong Guo, ShiLu Zhong, Fei Fang,
 Jing Zhao and Tian-Yi HU* 1268

Biomechanics-based active control of bedding support properties and its influence on sleep <i>D. Van Deun, V. Verhaert, T. Willemen, J. Wuyts, J. Verbraecken, V. Exadaktylos, B. Haex and J. Vander Sloten</i>	1274
Analysis of ergonomics conditions of a brand of mattress and pillows. University-Industry project, Medellín - Colombia <i>Luz M. Sáenz Zapata, Ana María L. Arias, Emilio C. Guzmán and Martha Arias de L</i>	1281
Body dimension measurements for pillow design for Taiwanese <i>Hsiao-Lin Chen and Dengchuan Cai</i>	1288
S-EinD 12 – Physical Demand on Ergonomic Design 2	
Technology and cognitive ability: the use of new technologies and the design of digital interfaces <i>Olavo Bessa</i>	1296
Comparison between static maximal force and handbrake pulling force <i>E. Chateauroux and X. Wang</i>	1305
Movement strategy and performance in a high-volume order picking workstation <i>Reinier Könemann, Tim Bosch and Michiel de Looze</i>	1311
A study of the kinematics of ingress and egress of upright and recumbent seats <i>Christopher Moore, Ashish Nimbarte, Sudhakar Rajulu and Fereydoun Aghazadeh</i>	1316
Ergonomics and design in a ischial support proposal for the Medellin metro, Colombia <i>Luz Mercedes Sáenz Zapata and Andrés Valencia Escobar</i>	1323
S-EinD 13 – Ergonomic Evaluation of Tools Design	
Ergonomic design intervention strategy for work tools development for women agro based workers in Northeast India <i>Debkumar Chakrabarti and Nandita Bhattachheriya</i>	1330
An ergonomic approach to design hand tool for agricultural production <i>Mahendra Singh Khidiya and Awadhesh Bhardwaj</i>	1335

A field experiment comparing mechanical demands of two pruners for flower cutting <i>S. Berrio, L.H. Barrero and L.A. Quintana</i>	1342
Openability of soft drinks PET packagings <i>Danilo Corrêa Silva, Luis Carlos Paschoarelli and José Carlos Plácido da Silva</i>	1346
The use of thermal manikin to evaluate interface pressure distribution <i>Flavia Renata Dantas Alves Silva Ciaccia, Clenilson Jordão Gonçalves and Laerte Idal Sznelwar</i>	1352
S-EinD 14 - Design for Special Population 1	
The hierarchy of needs to inclusive design <i>Júlio Carlos de Souza van der Linden and Clariana Fischer Brendler</i>	1357
Designing from activities. The “ability/difficulty table”, a useful tool to detect the “limit users” in the Design for All Approach <i>Giuseppe Di Bucchianico, Marco Gregori and Emilio Rossi</i>	1362
“EWS Matrix” and “EWG Matrix”: “De-sign for All” tools referred to the development of a enabling communication system for public spaces <i>Giuseppe Di Bucchianico, Stefania Camplone, Stefano Picciani and Valeria Vallese</i>	1368
Ergonomics and design for all <i>Isabella Tiziana Steffan and Francesca Tosi</i>	1374
The user testing toolset: a decision support system to aid the evaluation of assistive technology products <i>Andree Woodcock, Simon Fielden and Richard Bartlett</i>	1381
Auxiliary locomotion device to unload lower limbs, using user’s own secondary support <i>Eduardo J.W. Alves, Leandro E.V. Melo, Sérgio J. Silva and Jairo J.D. Câmara</i>	1387
S-EinD 15 Ergonomics and Accessibility)	
A Conceptual model for barrier free facilities planning <i>R.S. Bittencourt and L.B. de M. Guimarães</i>	1394

Ergonomics issues in conceiving an accessible project <i>A.L. Costa, P.V. Coura, M.M.A. Gomes, Y.R. Peregrino, B.R. Sarmiento and R.A. Sousa</i>	1403
Minimum housing spaces, flexibility and sustainability: a reflection on the basis of ergonomics intervention <i>Rayssa Cristiane Oliveira and Gleice Azambuja Elali</i>	1409
Ergonomics and accessibility for people with visual impairment in hotels <i>Larissa Nascimento dos Santos and Ricardo José Matos de Carvalho</i>	1417
S-EinD 16 – Ergonomics and the Built Environment	
Change of the layout of an office of a metallurgical company: simple projects, big solutions <i>Luiz Carlos da Silva Duarte, Moacir Eckhardt and Giordano Paulo da Motta</i>	1425
Workplace aesthetics: impact of environments upon employee health as compared to ergonomics <i>Elisabet Schell, Tores Theorell and Helena Saraste</i>	1430
Usability requirements for buildings: a case study on primary schools <i>Gabriella Duca</i>	1441
Ergonomic evaluation of the environment: a case study in a control room of the hydroelectric sector <i>Christianne Soares Falcão and Marcelo Marcio Soares</i>	1449
Evaluating attributes concepts for build environment <i>Gilberto R. Oliveira and Claudia Mont'Alvão</i>	1457
S-EinD 17 – Ergonomics for the Automotive Industry	
Development of objective discomfort evaluation indicators for a task-oriented motion using less constrained motion concept: application to automotive pedal clutching task <i>Pannetier Romain and Wang Xuguang</i>	1461
Three experiments to support the design of lightweight comfortable vehicle seats <i>P. Vink, M. Franz, I. Kamp and R. Zenk</i>	1466

Multi-platform experiment to cross a boundary between laboratory and real situational studies: experimental discussion of cross-situational consistency of driving behaviors <i>H. Terai, K. Miwa, H. Okuda, Y. Tazaki, T. Suzuki, K. Kojima, J. Morita, A. Maehigashi and K. Takeda</i>	1471
Ergonomic evaluation of interior design of Shoka vehicle and proposing recommendations for improvement <i>Adel Mazloumi and Fallah Mohammadreze</i>	1477
Adoption of ergonomic features in a new reach truck cabin design – a usability study <i>Maral Babapour, Anna-Lisa Osvalder and Lars-Ola Bligård</i>	1486
S-EinD 18 - Ergonomics, Design and Innovation	
Experimenting new design languages in contemporary home design <i>Francesca Tosi and Alessandra Rinaldi</i>	1493
The Intermodal Bike: multi-modal integration of cycling mobility through product and process innovations in bicycle design <i>Francesca Tosi, Alessandro Belli, Alessandra Rinaldi and Grazia Tucci</i>	1501
Ergonomic and usability analysis on a sample of automobile dashboards <i>Raissa Carvalho and Marcelo Soares</i>	1507
Towards the application of interaction design to digital TV content development <i>Francisco A.P. Fialho, Paloma Maria Santos, Marcus de Melo Braga and Anelise Thaler</i>	1515
Interface design and contemporary: human creating new guidelines for high-tech products <i>Andreia Salvan Pagnan, Giovana Freitas Rabelo Ribeiro, Maria Goretti Souza Gonçalves, Jairo José Drummond Câmara and Sandra Motta Baptista</i>	1524
An ergonomic study on the navigation structure and information units of websites with multimedia content. A case study of the Xbox 360 promotional website <i>Eduardo Ariel and Anamaria de Moraes</i>	1531

S-EinD 19 – Ergonomics and Information Design

- Urban ergonomics: an ongoing study of city signs and maps
Patricia Alves and Pedro Arezes 1534
- Ergonomics and design: traffic sign and street name sign
Janaina Luisa da Silva Moroni and José Luís Farinatti Aymone 1541
- A brief essay on ergonomics in graphic design
André N.F. Mendonça, Júlio C.S. van der Linden and Tania M.G. Fonseca 1547
- Informational ergonomics and design: signage design for Monte São Camp
Luiz Guilherme Oliveira Marques and Vânia Maria Batalha Cardoso 1553
- Analyzing Web pages visual scanpaths: between and within tasks variability
Gautier Drusch and J.M. Christian Bastien 1559
- Web accessibility: evaluation of a website with different semi-automatic evaluation tools
Edson Rufino de Souza and Cláudia Mont'Alvão 1567

Area – Ergonomics in Manufacturing**S-EinM 01 - Ergonomics in Manufacturing 1**

- The effect of job rotation intervals on muscle fatigue – lactic acid
Rodrigo Filus and Maria Lucia Okimorto 1572
- Members of the human body prone to musculoskeletal damages: a comparison between the sector of transportation and footwears production
Jeane F. Gomes de Lima, Geraldo Colaço, Ricardo da Silva and Francisco Masculo 1582
- Impact of hand forces and start/stop frequency on physiological responses to three forms of pushing and pulling: A South African perspective
A.I. Todd 1588
- Needs of ergonomic design at control units in production industries
I. Levchuk, A. Schäfer, K.-H. Lang, H.j. Gebhardt and A. Klussmann 1594

S-EinM 02 - Ergonomics in Manufacturing 2

- Cognitive Ergonomics: The Use Of Mind Mapping Tool In Maintaining Productive Sector Of A Brazilian Paper Company
Diegoa Mattos, José Robertoa Mateus and Eugenioa Merino 1599
- Analysis of the thermal comfort model in an environment of metal mechanical branch
N.M.Pinto, A.A.P. Xavier and Regiane T. do Amaral 1606
- Ergonomic analysis in cold storage rooms: a study of case
Hebert Roberto Silva and Cleudmar Amaral Araújo 1612
- Implementation of an ergonomics program for the welding department inside a car assembly company
Caceres Francisco and Troya Edwin 1618
- ### **S-EinM 03 - Ergonomics in Manufacturing 3**
- Successful integration of ergonomics into continuous improvement initiatives
Kimberly Monroe, Faye Fick and Madina Joshi 1622
- Investigating the effects of physical and cognitive demands on the quality of performance under different pacing levels
S. Shaikh, S.V.G. Cobb, D. Golightly, J.I. Segal and C.M. Haslegrave 1625
- DMAICR in an ergonomic risks analysis
E.F. Santos and C.R.C. Lima 1632
- Analysis of the lifted weight including height and frequency factors for workers in Colombia
Luis A. Saavedra-Robinson, Leonardo A. Quintana J, Luis Díaz Fortunato Leal and María Niño 1639
- Analysis of the workload imposed on the workers of the imprint and cutting/welding sectors of a flexible packaging manufacturer
L.B. de M. Guimarães, S.L.R. Pessa and C. Biguelini 1647

S-EinM 04 - Ergonomics in Manufacturing 4

- The RFad Method – a new fatigue recovery time assessment for industrial activities
Marcello Silva e Santos, Mario Cesar Rodriguez Vidal and Sergio Bastos Moreira 1656
- Noise analysis in professional office chairs
E.J.W. Alves, J.N. Filho, S.J. Silva and J.J.D. Câmara 1664
- The risk of developing repetitive stress injury in seamstresses, in the clothing industry, under the perspective of ergonomic work analysis: a case study
A.S. Melo 1670
- The regulation of work activity and the new labor and production contexts
Elaine Cristina Silva and Paulo Eduardo Gomes Bento 1677
- The footwear factory's assembly sector: opposing organizational structure and quality from the ergonomic work analysis
Kláudia M.M.N. Silva, Bernardo G.P. Coelho, V.S. Josemir, Luiz F.M. Faria, Ludmila Dutra, Marília Alvarenga, Renan Roggini and Eliza Helena de Oliveira Echternach 1683
- Evaluation of the impact of shiftwork and chronotype on the workers of the imprint and cutting/welding sectors of a flexible packaging manufacturer
L.B. de M. Guimarães, S.L.R. Pessa and C. Biguelini 1691

S-EinM 05 - Ergonomics in Manufacturing 5

- Human motion behavior while interacting with an industrial robot
Dino Bortot, Hao Ding, Alexandros Antonopolous and Klaus Bengler 1699
- Ergonomics in the formation of work condition quality
Adam Górný 1708
- Integration of human factors principles in LARG organizations – a conceptual model
Sara Figueira, V. Cruz Machado and Isabel L. Nunes 1712
- Production layout improvement in emergency services: a participatory approach
Mateus Zanatta and Fernando Gonçalves Amaral 1720

- Ergonomic analysis of workplaces in the iron casting industrial pole in Claudio, Minas Gerais - Brazil
Artur Caron Mottin, Carlos A. Silva de Miranda, Caroline Salvan Pagnan and Olavo Pena Monken 1727
- S-EinM 06 - Ergonomics in Manufacturing 6**
- The integrated assessment of occupational risks in a pharmaceutical manufacturing plant
Erminia Attaianese and Gabriella Duca 1733
- Ergonomic evaluation of processes and products in the manufacture of upholstery
Patrícia Bhering Fialho, Amaury Paulo de Souza, Luciano José Minette, José de Castro Silva and Luciana Aparecida de Oliveira 1739
- A socio-technical approach for improving a Brazilian shoe manufacturing system
J.S. Renner, L.B. de M. Guimarães and P.A.B. de Oliveira 1743
- Participative development of packages in the food industry – evaluation of ergonomics and productivity by objective measurements
Mikael Forsman, Eva Bernmark, Birgitta Nilsson, Sandra Pousette and Svend Erik Mathiassen 1751
- Ergonomics and Kaizen as strategies for competitiveness: a theoretical and practical in an automotive industry
Leandro Vieira, Giles Balbinotti, Adriano Varasquin and Leila Gontijo 1756
- S-EinM 07 - Ergonomics in Manufacturing 7**
- Modified track shoes and their effect on the EMG activity of calf muscles
Marlon Greensword, Fereydoun Aghazadeh and Saif Al-Qaisi 1763
- The specification of personalised insoles using additive manufacturing
André S. Salles and Diane E. Gyi 1771
- The reality of the women who make our lives easier: experience in a company that assembles electric motors in Venezuela
L. Yanes Escalona, R. Sandia Venot, E. Escalona and L. Yanes 1775

State of scientific knowledge about the need of recovery time at specific workplaces and recommendations for further research <i>C. Mühlemeyer, A. Klussmann, H. Gebhardt and K.H. Lang</i>	1778
Software development for the evaluation of the ergonomic compatibility on the selection of advanced manufacturing technology <i>A. Maldonado-Macias, R. Reyes, L. Guillen and J. Garcia</i>	1782
Construction of a survey to assess workload and fatigue among AMT operators in Mexico <i>Juan Luis Hernández Arellano, Gabriel Ibarra Mejía, J Nieves Serratos Pérez, Jorge Luis García Alcaraz and María Julia Brunett</i>	1790
Area – Healthcare Ergonomics	
S-HEALTH 01 - SYSTEMS APPROACH TO HEALTHCARE	
Fuzzy modelling and efficiency in health care systems <i>Ahmet F. Ozok</i>	1797
Using human factors engineering to improve patient safety in the cardiovascular operating room <i>Ayse P. Gurses, Elizabeth A. Martinez, Laura Bauer, George Kim, Lisa H. Lubomski, Jill A. Marsteller, Priyadarshini R. Pennathur, Chris Goeschel, Peter J. Pronovost and David Thompson</i>	1801
Workaround identification as an instrument for work analysis and design: a case study on ePrescription <i>Polyxeni Vassilakopoulou, Vassilis Tsagkas and Nicolas Marmaras</i>	1805
Characterizing complexity in socio-technical systems: a case study of a SAMU Medical Regulation Center <i>Angela Weber Righi, Priscila Wachs and Tarcísio Abreu Saurin</i>	1811
Examination of computer task exposures in radiologists: a work systems approach <i>Michelle M. Robertson, Philip Boiselle, Ronald Eisenberg, Dainel Siegal, Che-Hsu (Joe) Chang, Marvin Dainoff, Angela Garabet, Jennifer Bruno Garza and Jack Dennerlein</i>	1818
Ergonomic assessment among radiology technologists: a survey in a hospital <i>Fernando Lima Pais, Paulo Roberto Azevedo, Lícia Helena de Oliveira Medeiros, Iraí Borges de Freitas and Cláudia Stamato</i>	1821

S-HEALTH 02 - ORGANIZATIONAL ERGONOMICS IN HEALTHCARE 1

- Care giving and nursing, work conditions and humanitude®
Sylvain Biquand and Benoit Zittel 1828
- Ergonomics in the psychiatric ward towards workers or patients?
*Salerno Silvana, Forcella Laura, Di Fabio Ursula,
Figà Talamanca Irene and Boscolo Paolo* 1832
- Impact of ergonomics risk among workers in clothes central distribution
service in a hospital
D.A. Sacouche, L.C. Morrone and J.S. Silva 1836

S-HEALTH 03 - ORGANIZATIONAL ERGONOMICS IN HEALTHCARE 2

- An ergonomic analysis of work in the process of professional
rehabilitation in Brazil
A. Cabral, M. Souza e Silva, E. Louzada and W. Cesar 1841
- Ergonomic constraints among nursing workers in the sectors of emergency
care in two public hospitals in Brazil
*Maria Goreth Bandeira, Raimundo Lopes Diniz
and Ana Hélia Sardinha* 1849
- Injury prevention in physiotherapists - a scientific review
Deepak Sharan and P.S. Ajeesh 1855
- Musculoskeletal disorder related to the work of doctors who
perform medical invasive evaluation
*D.P. Maciel, R.A.M. Millen, C.A. Xavier, L.C. Morrone
and J.S. Silva* 1860

S-HEALTH 04 - PHYSICAL ERGONOMICS IN HEALTHCARE

- Work-related musculoskeletal discomfort and injuries in
Australian optometrists
Jennifer Long, Robin Burgess-Limerick and Fiona Stapleton 1864
- Risk reduction in musculoskeletal practice assistance professional
nursing pilot in semi intensive care unit
*A. Lemo, A.G. Silva, M. Tucheran, C. Talerman,
C.L. Guastelli and R.L. Borba* 1869

Factors contributing to work related low back pain among personal care workers in old age <i>Simon S. Yeung</i>	1873
Ergonomic evaluation of laparoendoscopic single-site surgery ports in a validated laparoscopic training model <i>Bernadette McCrory, Bethany R. Lowndes, Laura M. Wirth, Adam E. de Laveaga, Chad A. LaGrange and M. Susan Hallbeck</i>	1884
S-HEALTH 05 - PHYSICAL ERGONOMICS IN HEALTHCARE	
Musculoskeletal Disorders in Caregivers of Children with Cerebral Palsy Following a Multilevel Surgery <i>Deepak Sharan, P.S. Ajeesh, R. Rameshkumar and M. Manjula</i>	1891
Preventive and curative importance of the baropodometric analysis for ergonomics and occupational health <i>Vélez V. Martha Kenny, Nolivos Verónica and Alegría Fabricio</i>	1896
Ergonomic and individual risk evaluation <i>Vélez V. Martha Kenny, Nolivos Verónica and Alegría Fabricio</i>	1900
Recognizing nurse stakeholder dissonance as a critical determinant of patient safety in new healthcare information technologies <i>Elizabeth A. Samaras, Sara D. Real, Amber M. Curtis and Tessa S. Meunier</i>	1904
How are nurses at risk? <i>Elizabeth (Lizzy) M. Smith</i>	1911
S-HEALTH 06 - PHYSICAL ERGONOMICS IN HEALTHCARE: MANUAL HANDLING	
Screening of risk from patient manual handling with MAPO method <i>Natale Battevi and Olga Menoni</i>	1920
Definition of design criteria of mechanical transfer: an interaction between engineering and health areas <i>Taciana Ramos Luz and Eliza Helena de Oliveira Echternacht</i>	1928
Biomechanical and organizational risk and prevalence of low back pain in the old adults caregivers of a nursing home in Joao Pessoa/PB <i>Sânzia Bezerra Ribeiro, Maria Claudia Gatto Cárdua and Lais Cristina Almeida</i>	1933

- Study of musculoskeletal risks of the officebased surgeries
James E. Hermanson and Sang D. Choi 1940
- Quantitative posture analysis of 2D, 3D, and optical microscope
visualization methods for microsurgery tasks
*Denny Yu, Michael Sackllah, Charles Woolley,
Steven Kasten and Thomas Armstrong* 1944
- S-HEALTH 07 - PATIENT SAFETY AND QUALITY OF HEALTHCARE 1**
- Reducing latent errors, drift errors, and stakeholder dissonance
George M. Samaras 1948
- Quality in radiotherapy: effective treatment and patient safety
Adelaide Nascimento and Pierre Falzon 1956
- A comparative study of occupancy and patient care quality in four
different types of intensive care units in a children's hospital
Thomas J. Smith 1961
- Interventions to prevent needle stick injuries among health care workers
*Henk F. van der Molen, Koos A.H. Zwinderman,
Judith K. Sluiter and Monique H.W. Frings-Dresen* 1969
- Managing unforeseen events in anesthesia: collective trade-off between
"understanding" and "doing"
L. Cuvelier, P. Falzon, J.C. Granry and M.C. Moll 1972
- S-HEALTH 08 - SPECIAL TOPICS IN HEALTHCARE 1**
- Improving wheelchair prescription: an analysis of user needs and
existing tools
*Louise Moody, Andree Woodcock, Mike Heelis, Cynthia Chichi,
Simon Fielden and Dimitar Stefanov* 1980
- Automatic sleep stage classification based on easy to register signals
as a validation tool for ergonomic steering in smart bedding systems
*Tim Willemen, Dorien Van Deun, Vincent Verhaert,
Sandra Pirrera, Vasileios Exadaktylos, Johan Verbraecken,
Bart Haex and Jos Vander Sloten* 1985
- The impacts of painful noise in the apprehension of sound references
on context of a big band
Taciana Ramos Luz and Eliza Helena de Oliveira Echternacht 1990

Horizontal plane sound source localization and auditory enhancement <i>Jan R. Smith, Wesley R. Lombard and Moses N. Shaba</i>	1994
Moral harassment of public schools teachers <i>Izabel Carolina Martins Campos, Alessandra da Cruz Serafim, Kamilla Valler Custódio, Lizandra da Silva and Roberto Moraes Cruz</i>	2001
S-HEALTH 09 - SPECIAL TOPICS IN HEALTHCARE 2	
The 'urge to move' on body supports <i>R.H.M. Goossens</i>	2008
Kinematic analysis of post office employees' workstations <i>Francesco Draicchio, Alessio Silveti, Federico Forzano, Sergio Iavicoli and Alberto Ranavolo</i>	2012
Accessibility of sports facilities for persons with reduced mobility and assessment of their motivation for practice <i>Maria Manuel Sá, Rui Azevedo, Maria Cristina Martins, Oswaldo Machado and João Tavares</i>	2017
Hand therapy and ergonomics: integration of approaches in vocational rehabilitation and promotion of decent work in Brazil <i>Thaís Tosetto and Flávia Giuntini Orsi</i>	2024
Effects of wearing a pressure redistribution belt while lying in a hospital bed <i>François Fraysse, Nathan Daniell and Gunther Paul</i>	2030
Design of an ergonomic ultrasound system: accommodation of user anthropometrics <i>Sung Park, Jinho Yim and Goeun Lee</i>	2037
S-HEALTH 10 - SPECIAL TOPICS IN HEALTHCARE 3	
Weight gain in relation to night work among nurses <i>Elaine C. Marqueze, Lucia C. Lemos, Nilson Soares, Geraldo Lorenzi-Filho and Claudia R.C. Moreno</i>	2043
Relationship between exposure to cement and the incidence of respiratory diseases in children: a preventive perspective <i>A. Borba, A. Santos, Y. Santos and F. Porto</i>	2049

Quick Exposure Check (QEC): a crosscultural adaptation into Brazilian-Portuguese <i>Maria Luiza C. Comper, Leonardo O.P. Costa and Rosimeire S. Padula</i>	2056
Moral harassment at work model and inability <i>Izabel C. Martins Campos, Lizandra da Silva, Rafaela Luiza Trevisan and Roberto Moraes Cruz</i>	2060
S-HEALTH 11 - SPECIAL TOPICS IN HEALTHCARE 4	
Design and ergonomics of package inserts of drugs in Brazil: a reality in construction <i>Charles Ricardo Leite da Silva and Marcelo Marcio Soares</i>	2068
How user diversity and country of origin impact the readiness to adopt E-health technologies: an intercultural comparison <i>Wiktoria Wilkowska, Martina Ziefle and Firat Alagöz</i>	2072
Using walker during walking : a pilot study for health elder <i>Yeh Po-Chan and Leung Cherng-Yee</i>	2081
An office chair to influence the sitting behavior of office workers <i>R.H.M. Goossens, M.P. Netten and B. Van der Doelen</i>	2086
Area – Human Factors and Sustainable Development	
S-HFSD 01 - Human Factors and Sustainable Development 01	
A low cost technique to evaluate usable product for small manufacturing companies: a case study on Garcia robot <i>Vatana An and Marcelo Soares</i>	2089
Social responsibility and work conditions : building a reference label, Démarche T® <i>Sylvain Biquand and Benoit Zittel</i>	2097
A study of material composition disclosure practices in green footwear products <i>Jocelise J. Jacques and Lia B.M. Guimarães</i>	2101
Designing for multiple global user populations: increasing resource allocation efficiency for greater sustainability <i>G. Nadadur and M.B. Parkinson</i>	2109

The usability of a product can be an ally of sustainability <i>Thaiana P. Anjos, Márcio Matias and Leila A. Gontijo</i>	2117
S-HFSD 02 - Human Factors and Sustainable Development 02	
Cooking behaviours: a user observation study to understand energy use and motivate savings <i>Luis Oliveira, Val Mitchell and Kevin Badni</i>	2122
The importance of ergonomics to sustainability throughout a building's life cycle <i>Linda Miller, Julie Dorsey and Karen Jacobs</i>	2129
Ergoecology: evolution and challenges <i>Gabriel García-Acosta, Martha Helena Saravia Pinilla and Carles Riba i Romeva</i>	2133
The human component of sustainability: a study for assessing "human performances" of energy efficient construction blocks <i>Erminia Attaianese and Gabriella Duca</i>	2141
S-HFSD 03 - Human Factors and Sustainable Development 03	
User-centered ecotourism development <i>L. Talsma and J.F.M. Molenbroek</i>	2147
A broader consideration of human factor to enhance sustainable building design <i>Erminia Attaianese</i>	2155
Sustainability and cities: a proposal for implementation of a sustainable town <i>L.B. de M. Guimarães</i>	2160
VLT: A sustainable solution to urban mobility, in João Pessoa-PB <i>Uiara Wasconcelos de Assis and Glaucia Wasconcelos Silva</i>	2169
Design and the global and human wellbeing <i>Geisy Anny Venâncio, Adriano Heemann and Liliane Iten Chaves</i>	2175

Environmental management performance for brazilian industrials: measuring with the item response theory <i>Andréa Cristina Trierweiller, Blênio César Severo Peixe, Rafael Tezza, Antonio Cezar Bornia, Dalton Francisco de Andrade and Lucila Maria de Souza Campos</i>	2179
Area – Human Simulation and Virtual Environments	
S-HSVE 01 - Human Simulation and Virtual Environments 1	
Adaptive information design for outdoor augmented reality <i>Jan A. Neuhöfer, Felix Govaers, Hichem El Mokni and Thomas Alexander</i>	2187
Comparing two types of navigational interfaces for Virtual Reality <i>Luis Teixeira, Elisângela Vilar, Emília Duarte, Francisco Rebelo and Fernando Moreira da Silva</i>	2195
On the effect of free vs. restricted interaction during the exploration of virtual environments <i>Jessica Conradi and Thomas Alexander</i>	2201
Evaluating the iterative development of VR/AR human factors tools for manual work <i>Paul M. Liston, Alison Kay, Sam Cromie, Chiara Leva, Mirabelle D’Cruz, Harshada Patel, Alyson Langley, Sarah Sharples and Susanna Aromaa</i>	2208
Preparative study regarding the implementation of a muscular fatigue model in a virtual task simulator <i>David Brouillette, Guillaume Thivierge, Denis Marchand and Julie Charland</i>	2216
S-HSVE 02 - Human Simulation and Virtual Environments 2	
Patterns of correlation between vehicle occupant seat pressure and anthropometry <i>Gunther Paul, Nathan Daniell and François Fraysse</i>	2226
New enhancements and validation of force based posture and discomfort predictions <i>Hans-Joachim Wirsching and Florian Engstler</i>	2232

DHM in Human-Centered Product Design: A Case-Study on Public Transport Vehicle <i>V. Santos, C.P. Guimarães, G.A.N. Franca, G.L. Cid and A.G. Paranhos</i>	2238
DHM simulation in virtual environments: a case-study on control room design <i>M. Zamberlan, V. Santos, P. Streit, J. Oliveira, R. Cury, T. Negri, F. Pastura, C. Guimarães and G. Cid</i>	2243
Digital test assembly of truck parts with the IMMA-tool - an illustrative case <i>L. Hanson, D. Högberg and M. Söderholm</i>	2248
Features and limitations of digital human models - a new German guideline <i>Gert Zülch</i>	2253
S-HSVE 03 - Human Simulation and Virtual Environments 3	
Elbow torque ellipses: investigation of the mutual influences of rotation, flexion, and extension torques <i>Fabian Guenzkofer, Heiner Bubb and Klaus Bengler</i>	2260
Modeling human-bed interaction: the predictive value of anthropometric models in choosing the correct bed support <i>Vincent Verhaert, Hans Druyts, Dorien Van Deun Tom De Wilde, Karel Van Brussel, Bart Haex and Jos Vander Sloten</i>	2268
Applications of agent-based simulation for human socio-cultural behavior modeling <i>Hong Jiang, Waldemar Karwowski and Tareq Z. Ahram</i>	2274
DHM and serious games: a case-study oil and gas laboratories <i>V. Santos, M. Zamberlan, P. Streit, J. Oliveira, C. Guimarães, F. Pastura and G. Cid</i>	2279
Skill training in Multimodal virtual environments <i>Daniel Gopher</i>	2284

- The added value of virtual reality technology and force feedback for surgical training simulators
L. Zhang, C. Grosdemouge, V.S. Arikatla, W. Ahn, G. Sankaranarayanan, S. De, D. Jones, S. Schwaitzberg and C.G.L. Cao 2288
- Area – Musculoskeletal Disorders**
S-MSDs 01 - Methods and tools for WMSDs prevention with a special attention to economic issues
- Musculoskeletal disorders: a new approach
Kamiel Vanwonderghem, Pongjan Yoopat and Christophe Maes 2293
- Proper manual handling techniques to prevent low back pain, a Cochrane Systematic Review
Jos H. Verbeek, Kari-Pekka Martimo, P. Paul F.M. Kuijter, Jaro Karppinen, Eira Viikari-Juntura and Esa-Pekka Takala 2299
- Cost-efficient observation of working postures from video recordings – more videos, more observers or more views per observer?
Svend Erik Mathiassen, Per Liv and Jens Wahlström 2302
- The trade-off between meticulousness and methodological variance in normalization of low back EMG
Jemie Jackson and Svend Erik Mathiassen 2307
- The economic evaluation of a Participatory Ergonomics programme to prevent low back and neck pain
Maurice Driessen, Judith Bosmans, Karin Proper, Johannes Anema, Paulien Bongers and Allard van der Beek 2315
- S-MSDs 02 - Advanced manufacturing systems and WMSD prevention**
- Lean production and work-related musculoskeletal disorders: overviews of international and Swedish studies
Mikael Brännmark and Malin Håkansson 2321
- An integrated tool to support engineers for WMSDs risk assessment during the assembly line balancing
Raffaele Di Benedetto and Michele Fanti 2329

Handwheel valve operation: assessment of four opening methods in terms of muscle loading, perceived comfort, and efficiency <i>Fereydoun Aghazadeh, Saif Al Qaisi, Francis Hutchinson and Laura Ikuma</i>	2334
Quantitative analysis of repetitive movement as a tool for diagnostic support in ergonomics <i>Paulo Antonio Barros Oliveira and Juliana Scopel</i>	2341
Old scissors to industrial automation: the impact of technologic evolution on worker's health <i>Rita de Cassia Clark Teodoroski, Vanessa Mazzocchi Koppe and Eugênio Andrés Díaz Merino</i>	2349
S-MSDs 03 - Methods for risk assessment	
Method inventory for assessment of physical activity at VDU workplaces <i>Rolf Ellegast, Britta Weber and Rena Mahlberg</i>	2355
Assessing manual lifting tasks based on segment angle interpolations <i>Chien-Chi Chang, Xu Xu, Gert S. Faber, Idsart Kingma and Jack Dennerlein</i>	2360
Prevalence of low back disorders among female workers and biomechanical limits on the handling of load and patients <i>Manuel Gutiérrez and Jorge Monzó</i>	2364
Application of discriminant analysis-based model for prediction of risk of low back disorders due to workplace design in industrial jobs <i>G.M.D. Ganga, K.F. Esposito and D. Braatz</i>	2370
S-MSDs 04 - Contributions to methods for risk assessment and studies on working postures and muscular activity	
Developing a framework for assessing muscle effort and postures during computer work in the field: the effect of computer activities on neck/shoulder muscle effort and postures <i>J.L. Bruno Garza, B.H.W. Eijkelhof, P.W. Johnson, S.M. Raina, P. Rynell, M.A. Huysmans, J.H. van Dieën, A.J. van der Beek, B.M. Blatter and J.T. Dennerlein</i>	2377

Evaluation of a personal device in reducing the risk of low back disorders during stooped work <i>Brent L. Ulrey and Fadi A. Fathallah</i>	2381
Spinal disc hydration status during simulated stooped posture <i>Kenneth Johannaber and Fadi A. Fathallah</i>	2384
Principle component analysis of exposure variation analysis during computer work at presence of delayed onset muscle soreness <i>A. Samani, A. Kawczyński, J. Chmura and P. Madeleine</i>	2387
Interactions between task repetition and psychosocial factors <i>Michael W. Riley, Yu-Ting Hung, Mao-Jiun Wang, Yueh-Ling Lin and Jessica C. Blunk</i>	2392
S-MSDs 05 - Prevention, disability and return at work	
Mitigation of musculoskeletal problems and body discomfort of agricultural workers through educational intervention <i>Rekha Vyas</i>	2398
Swabbing: touchscreen-based input technique for people with hand tremor <i>Alexander Mertens, Jan Hurtmanns, Chatchavan Wacharamanotham, Martin Kronenbürger, Jan Borchers, and Christopher M. Schlick</i>	2405
Evaluation of the exercise intervention with the “Back School” Education Program in a Brazilian company of cigars: a case study <i>Sânzia Bezerra Ribeiro, Djeynefer Silveira Wagemacker and Lilian Becerra de Oliveira</i>	2412
Low back pain disability and stay at work: contradiction or necessity? <i>Rosimeire Simprini Padula, Rodrigo Luiz Carregaro, Bruna Melo, Cláudia Regina da Silva and Ana Beatriz Oliveira</i>	2417
S-MSDs 06 - MSD Outcomes in different jobs-1	
Body discomfort in poultry slaughterhouse workers <i>Adriana Seára Tirloni, Diogo Cunha dos Reis, Josenei Braga dos Santos, Pedro Ferreira Reis, Ailton Barbosa and Antônio Renato Pereira Moro</i>	2420
Effect of low back pain on social and professional life of drivers of Kolkata <i>Somnath Gangopadhyay and Samrat Dev</i>	2426

Computer use and ulnar neuropathy: results from a case-referent study <i>J.H. Andersen, P. Frost, A. Fuglsang-Frederiksen, B. Johnson and S. Wulff Svendsen</i>	2434
Associations between psychosocial risk factors and musculoskeletal disorders: application to the IT profession in India <i>Ranjana K. Mehta and Prakriti Parijat</i>	2438
Musculoskeletal symptoms, postural disorders and occupational risk factors: correlation analysis <i>Maria Luiza C. Comper, Felipe Macedo and Rosimeire S. Padula</i>	2445
S-MSDs 07 - MSD Outcomes in different jobs-2	
Nurses' working tasks and MSDs back symptoms: results from a national survey <i>Florentino Serranheira, Teresa Cotrim, Victor Rodrigues, Carla Nunes and António Sousa-Uva</i>	2449
Prevalence of musculoskeletal disorders among staffs in specialized healthcare centre <i>Nurul Ikhmar Ibrahim and Devinthiran Mohanadas</i>	2452
Physical and psychosocial indicators among office workers from public sector with and without musculoskeletal symptoms <i>Dechristian França Barbieri, Helen Cristina Nogueira, Letícia Januário Bergamin and Ana Beatriz Oliveira</i>	2461
An ergonomic study on the onset of mental fatigue among the load handling workers of a central market area in Kolkata <i>Somnath Gangopadhyay and Tamal Das</i>	2467
Discrepancies in pain presentation caused by adverse psychosocial conditions as compared to pain due to high physical workload? <i>Inger Arvidsson, Jenny Gremark Simonsen, Istvan Balogh, Gert-Åke Hansson, Camilla Dahlqvist, Lothy Granqvist, Kerstina Ohlsson, Anna Axmon, Björn Karlson and Catarina Nordander</i>	2472
S-MSDs 08 - Risk for MSD in different tasks and jobs – 1	
Reducing whole body vibration in forklift drivers <i>R. Motmans</i>	2476

Analysis of urban cleanliness agents' workstation on the appearance of Work Related Musculoskeletal Disorders <i>Leonildo Santos do Nascimento and Juliana da Costa Santos Pessoa</i>	2482
Evaluation and redesign of manual material handling in a vaccine production centre's warehouse <i>Yaniel Torres and Silvio Viña</i>	2487
Biomechanical analysis of loading/unloading a ladder on a truck <i>Cristiane Shinohara Moriguchi, Leticia Carnaz, Luiz Carlos de Miranda Junior, Richard William Marklin and Helenice Jane Cote Gil Coury</i>	2492
S-MSDs 9 - Risk for MSD in different tasks and jobs – 2	
Evaluation of lumbar overload in hotel maids <i>J.S. Silva, L.R.C. Correa and L.C. Morrone</i>	2496
Participatory ergonomics among female cashiers from a department store <i>María Yanire León Cristancho</i>	2499
Biomechanical strain of goldsmiths <i>Paula Emanuela Fernandes Cândido, Juliana Vieira Schmidt Teixeira, Antônio Renato Pereira Moro and Leila Amaral Gontijo</i>	2506
Risk factors for repetitive strain injuries among school teachers in Thailand <i>Sunisa Chaiklieng and Pornnapa Suggaravetsiri</i>	2510
Job factors related to musculoskeletal symptoms among nursing personnel – a review <i>Marina Zambon Orpinelli Coluci and Neusa Maria Costa Alexandre</i>	2516
S-MSDs 10 - Studies on muscle activities	
Study on lumbar kinematics and the risk of low back disorder in female university students by using shoes of different heel heights <i>Rauf Iqbal, Amitabha De, Wricha Mishra, Shreya Maulik and A.M. Chandra</i>	2521

Motor variability – an important issue in occupational life <i>Divya Srinivasan and Svend Erik Mathiassen</i>	2527
Long periods with uninterrupted muscle activity related to neck and shoulder pain <i>Therese N. Hanvold, Morten Wærsted and Kaj Bo Veiersted</i>	2535
Specificity of back muscle response to submaximal fatiguing contractions <i>Nils Fallentin, Rammohan Maikala, Jacob Banks, Niall Obrien and Amanda Rivard</i>	2593
Stationarity test of electromyographic signals during isokinetic trunk exertions <i>Young-Jin Cho and Jung-Yong Kim</i>	2545
Muscular activity in different locomotion plans with the use of various shoes types and barefoot <i>Geraldo Fabiano de Souza Moraes, Davidson Passos Mendes and Adriana Antunes Papinni</i>	2549
S-MSDs 11 - Clinical aspects of WMSDs and further contribution to analysis of posture and WMSDs	
Preventing Rsi/Wruul: use of esthesiometry to assess hand tactile sensitivity of slaughterhouse workers <i>P. Reis and A. Moro</i>	2556
Comparative analysis of assessment of the craniocervical equilibrium through two methods: cephalomotry of Rocabado and cervical range of Motion <i>Lilian Becerra de Oliveira, Franklin Cajaíba, Wesley Costa, Mariano Rocabado, Rodrigo Lazo-Osório and P.T. Sanzia Ribeiro</i>	2563
Analysis of temperature on the surface of the wrist due to repetitive movements using sensory thermography <i>C. Camargo, J. Ordorica, E.J. De la Vega, J.E. Olguín, O.R. López and J.A. López</i>	2569
Functional analysis of scapular position in asymptomatic professors <i>Geraldo Fabiano de Souza Moraes and Davidson Passos Mendes</i>	2576

Shoes influence in women posture <i>Geraldo Fabiano de Souza Moraes, Davidson Passos Mendes and Adriana Antunes Papinni</i>	2582
S-MSDs 12 - Miscellanea of techniques for analysis and applications useful for WMSDs prevention	
Can digital signals from the keyboard capture force exposures during typing? <i>Jeong Ho Kim and Peter W Johnson</i>	2588
Notebook computer use with different monitor tilt angle: effects on posture, muscle activity and discomfort of neck pain users <i>Wen-Ko Chiou, Wei-Ying Chou and Bi-Hui Chen</i>	2591
Usability analysis of 2D graphics software for designing technical clothing <i>Rita de Cassia Clark Teodoroski, Edilene Zilma Espindola, Enéias Silva, Antônio Renato Pereira Moro and Vera Lucia D.V. Pereira</i>	2596
Area – Organizational Design and Management	
S-ODAM 01 - Telework, Knowledge Workers and Office Design: Effects on Comfort, Health and Productivity	
The effects of new ways of work in the Netherlands: national data and a case study <i>P. Vink, M. Blok, M. Formanoy, E. de Korte and L. Groenesteijn</i>	2600
New Ways of Working: does flexibility in time and location of work change work behavior and affect business outcomes? <i>Merle M. Blok, Liesbeth Groenesteijn, Roos Schelvis and Peter Vink</i>	2605
Examining the macroergonomics and safety factors among teleworkers: Development of a conceptual model <i>Michelle M. Robertson, Lawrence M. Schleifer and Yueng-hsiang Huang</i>	2611
Expectation Changes and Team Characteristics in a Participatory Design Process <i>Conne Mara Bazley, Annelise De Jong and Peter Vink</i>	2616

Occupational health and safety professionals strategies to improve working environment and their self-assessed impact <i>Kirsten Olsen</i>	2625
S-ODAM 02 - Implementation and Intervention Strategies, Cross-Cultural issues: Macroergonomics Approaches	
Implementation of ergonomics in a service unit: challenges and advances <i>Eliane Villas Bôas de Freitas Penteado, Maria Goretti de França, Ana Maria de Brito Ramalhoto, Ana Maria de Oliveira, Bruno Rangel Cortopassi Machado and Joana Angélica Matos Genipapeiro</i>	2633
Implantation of an ergonomics administration system in a company: report of an occupational therapist specialist in ergonomics <i>Berla Moraes and Valéria Sousa Andrade</i>	2637
The PhOCoe Model – ergonomic pattern mapping in participatory design processes <i>Marcello Silva e Santos</i>	2643
Macroergonomic aspects in the design of development programs in IDCs <i>Denis A. Coelho, Patricia R. Ferrara, Ana F. Couvinhas, Tânia M. Lima and Jake K. Walter</i>	2651
S-ODAM 03 - Macroergonomics: Sustainability and Safety Factors in Healthcare and High Risk Organizations	
Conditions for the successful integration of Human and Organizational Factors (HOF) in the nuclear safety analysis <i>Michèle Tosello, Françoise Lévêque, Stéphanie Dutilleul, Guillaume Hernandez and Jean-François Vautier</i>	2656
Analysis of organizational conditions for risk management: the case study of a petrochemical site <i>Gaudart Corinne, Garrigou Alain and Chassaing Karine</i>	2661
Organizational issues that impact on non-use of equipment for individual protection: a view of ergonomics <i>Eva Bessa Soares</i>	2668

**S-ODAM 04 - Workforce flexibility, System Design, and
Economics of Human Performance**

- Analysis of the strain on employees in the retail sector considering
work-life balance
Gert Zülch, Patricia Stock and Daniel Schmidt 2675
- Visualization of regulations to support design and quality
control – a long-term study
Mikael Blomé 2683
- Macroergonomic analysis of two different work organizations
in a same sector of a luminary manufacturer
*Rosimeire Sedrez Bitencourt and
Lia Buarque de Macedo Guimarães* 2686
- Macroergonomics' contribution to the effectiveness of
collaborative supply chains
Sandra Mejias Herrera and Luisa Huaccho Huatuco 2695
- Understanding the collaborative-participatory design
*Cristiele A. Scariot, Adriano Heemann and
Stephania Padovani* 2701
- Participatory design in lean production: which contribution from
employees? for what end?
M.S. Perez Toralla, P. Falzon and A. Morais 2706

**S-ODAM 05 - Sustainability of Work Systems: Optimizing Human
and System Performance**

- The workers role in knowledge management and sustainability policies
Ivan Bolis, Claudio Brunoro and Laerte Idal Szelwar 2713
- Ergonomic sustainability based on the ergonomic maturity level
measurement
*Mario Cesar Vidal, Carmen Lucia Campos Guizze,
Renato José Bonfatti and Marcello Silva e Santos* 2721
- How could you use the ergonomics 'knowhow' transfer
management to enhance human working for sustainable improvements
in industrially developing countries?
Faramarz Helali 2730

Sustainable development induction in organizations: a convergence analysis of ISO standards management tools' parameters <i>Fabricao Kurman Merlin, Vera Lúcia Duarte do Valle Pereira and Waldemar Pacheco</i>	2736
Involvement and emancipation of the worker. Action research in a university hospital <i>Ivan Bolis, Claudio Brunoro and Laerte Idal Sznelwar</i>	2744
Partnering for workplace health and safety <i>Verna Blewett and Jill Dorrian</i>	2753
S-ODAM 06 - Work System Analysis and Design, Work Organization and Prevention of Musculoskeletal Disorders	
Development of a knowledge management system for complex domains <i>André Perott, Nils Schader, Ralph Bruder and Jörg Leonhardt</i>	2757
Prevention of MSD within OHSMS/IMS: a systematic review of risk assessment strategies <i>Amin Yazdani and Richard Wells</i>	2765
Macroergonomic analysis of an assembly sector of a furniture company <i>A.A.Z. Cristiane, M.D. Danielle and C.B. Vanessa</i>	2768
S-ODAM 07 - Macroergonomics Tools, Corporate Strategies and Organizational Effectiveness	
Linking human factors to corporate strategy with cognitive mapping techniques <i>Judy Village, Michael Greig, Filippo A. Salustri and W. Patrick Neumann</i>	2776
Economics of human performance and systems total ownership cost <i>Wilawan Onkham, Waldemar Karwowski and Tareq Z. Ahram</i>	2781
Job stress management protocol using a merge between cognitive-behavioral techniques and ergonomic tools <i>Elaine Viola and Mario Cesar Vida</i>	2789

Measuring organizational effectiveness in information and communication technology companies using item response theory <i>Andréa Cristina Trierweiler, Blênio César Severo Peixe, Rafael Tezza, Vera Lúcia Duarte do Valle Pereira, Waldemar Pacheco, Antonio Cezar Bornia and Dalton Francisco de Andrade</i>	2795
Area – Process Control	
S-PC 01 - Process Control 01	
A computerized system to monitor resilience indicators in organizations <i>Paulo Victor Rodrigues de Carvalho, Alan Pinheiro de Souza and Jose Orlando Gomes</i>	2803
A program to support the construction and evaluation of resilience indicators <i>Gilbert Jacob Huber, Jose Orlando Gomes and Paulo Victor Rodrigues de Carvalho</i>	2810
Organizational ergonomics of occupational health methods and processes in a Brazilian oil refinery <i>Lucy M.S. Bau, Jean P. Farias, Sandro A. Buso and Carolina R. Marcon Passero</i>	2817
Ergonomics Program Management in Tucuruí Hydropower Plant using TPM Methodology <i>R.M. Santos, A.C. Sassi, B.M. Sá, S.A. Miguez and A.A. Pardaul</i>	2822
Analysis of mental workload of electrical power plant operators of control and operation centers <i>Daiana Martins Vitorio, Francisco Soares Masculo and Miguel O.B.C. Melo</i>	2831
S-PC 02 - Process Control 02	
The alarm system and a possible way forward <i>Håkan Alm and Anna-Lisa Osvalder</i>	2840
HMI conventions for process control graphics <i>Ruud N. Pikaar</i>	2845

Development of an expert system for abnormal operating procedures in a main control room <i>Min-Han Hsieh, Sheue-Ling Hwang, Kang-Hong Liu, Sheau-Farn Max Liang and Chang-Fu Chuang</i>	2853
Transfer of control system interface solutions from other domains to the thermal power industry <i>L.-O. Bligård, J. Andersson and A.-L. Osvalder</i>	2859
Area – Psychophysiology in Ergonomics	
S- PsyErg 01 - Psychophysiology in Ergonomics 01	
Participatory ergonomics for psychological factors evaluation in work system design <i>Lingyan Wang and Henry Y.K. Lau</i>	2866
Effect of Ergonomic and Workstyle Risk Factors on Work Related Musculoskeletal Disorders among IT Professionals in India <i>Deepak Sharan and P.S. Ajeesh</i>	2872
Slaughterhouse workers exposed to cold: proposal of reference thermography values for hands <i>Márcia Rosângela Buzanello and Antônio Renato Pereira Moro</i>	2876
Psychological determinants of information searching activity <i>L. Gorunova</i>	2882
Minor psychiatric disorders among nursing workers – is there an association with current or former night work? <i>Thiago Bernardes Diniz, Aline Silva-Costa, Rosane Harter Griep and Lúcia Rotenberg</i>	2887
S-PsyErg 02 - Psychophysiology in Ergonomics 02	
Concurrent cognitive task may improve motor work performance and reduce muscle fatigue <i>Maria Evstigneeva, Aleksandr Aleksandrov, Svend Erik Mathiassen and Eugene Lyskov</i>	2893
Effects of physical and mental demands on shoulder muscle fatigue <i>Ranjana K. Mehta and Michael J. Agnew</i>	2897

- False alarms and incorrect rejections in an information security center: correlation with the frequency of incidents
Thiers Bruno and Julia Abrahão 2902
- Occupational stress, working condition and nutritional status of military police officers
Ángela Maria C. Santana, Josiane Keila V. Gomes, Dione De Marchi, Yassana M. Girondoli, Lina E.F.P. de Lima Rosado, Gilberto Paixão Rosado and Isabel Maria de Andrade 2908
- Area – Safety and Health**
S-Saf&Hth 01 - Health Care & Safety at Work
- Interventions to improve patient safety in transitional care – a review of the evidence
Kristin laugaland, Karina aase and Paul barach 2915
- Radiological emergency response for community agencies with cognitive task analysis, risk analysis, and decision support framework
Travis S. Meyer, Joseph Z. Muething, Gustavo Amoras Souza Lima, Breno Raemy Rangel Torres, Trystyn Keia del Rosario, José Orlando Gomes and James H. Lambert 2925
- Supporting the scholar role in intensive care nursing
M. Melles, A. Freudenthal and H. de Ridder 2933
- Handover process: how to improve quality and safety through an ergonomic solution
Giulio Toccafondi, Sara Albolino, Tommaso Bellandi and Francesco Venneri 2941
- The actuation of Physioterapy in the certifications of occupational quality, health and safety
Helanara Salvati Bertolossi Moreira, Bruna Talini, Isabele Maia Galvão, José Mohamud Vilagra, Eduardo Gallas Leiva and Abel Santos de Oliveira 2946

S-Saf&Hth 02 - Occupational Stress

- Job strain in different types of employment affects the immune response
*Paolo Boscolo, Laura Forcella, Marcella Reale,
 Giovina Vianale, Uliano Battisti, Roberta Bonfiglioli,
 Michela Cortini, Luca Di Giampaolo, Angela Di Donat
 and Silvana Salerno* 2950
- Job Stress and Productivity Increase
Samson Sunday Adaramola 2955
- Burnout syndrome and Brazilian civil aviation: a short essay on the
 focus on prevention
M. Castro and L. Araujo 2959
- Is occupational stress associated with work engagement?
*Rosimeire Simprini Padula, Luciana Dias Chiavegato,
 Cristina Maria Nunes Cabral, Talita Almeida, Thais Ortiz
 and Rodrigo Luiz Carregaro* 2963
- Occupational stress and biomechanical risk in a high fashion
 clothing company
*Laura Forcella, Roberta Bonfiglioli, Piero Cutilli, Andrea Antonucci,
 Angela Di Donato, Eugenio Siciliano, Michela Cortini,
 Francesco Saverio Violante and Paolo Boscolo* 2966

S-Saf&Hth 03 - Noise and Safety at Work

- Comparison between occupational noise measurement strategies:
 why is it important?
Susana Costa and Pedro Arezes 2971
- SCANAM method for the assessment of industrial noise
Aleksandar Zunjic 2974
- Analysis of noise on construction sites of high-rise buildings
*Béda Barkokébas, Bianca M. Vasconcelos,
 Eliane Maria G. Lago and Aline Fabiana P Alcoforador* 2982
- The binomial work-health in the transit of Curitiba city
*Eunice Tokars, Antonio Renato Pereira Moro
 and Roberto Moraes Cruz* 2991

S-Saf&Hth 04 - Occupational Health

- How can occupational health services in Sweden contribute to work ability?
Lisa Schmidt, John Sjöström and Ann-Beth Antonsson 2998
- Order-picking in deep cold – physiological responses of younger and older females. Part 1: heart rate
Karsten Kluth, Sandra Baldus and Helmut Strasser 3002
- Order-picking in deep cold – physiological responses of younger and older females. Part 2: body core temperature and skin surface temperature
Sandra Baldus, Karsten Kluth and Helmut Strasser 3010
- System modeling with the DISC framework: evidence from safety-critical domains
Teemu Reiman, Elina Pietikäinen, Pia Oedewald and Nadezhda Gotcheva 3018

S-Saf&Hth 05 - Occupational Health and Hazards

- The effect on employees of violence climate in the workplace
Serpil Aytac and Salih Dursun 3026
- Indicators of healthy work environments – a systematic review
Per Lindberg and Eva Vingård 3032
- Effects of vibration exposure on professional drivers: a field test for quantifying visual and cognitive performance
N. Costa, P.M. Arezes and R.B. Melo 3039

S-Saf&Hth 06 - Policies & Regulations in Occupational Health

- In regulation we trust
Siri Wiig and Jorunn Elise Tharaldsen 3043
- Whistleblowers : an essential resource for the sustainable prevention of risks in sociotechnical systems
Tahar Hakim Benchekroun and Sandrine Pierlot 3051
- The nexus between OSH and subcontracting
Isabel L. Nunes 3062

Identification of non-technical skills from the resilience engineering perspective: a case study of an electricity distributor <i>Priscila Wachs, Angela Weber Righi and Tarcisio Abreu Saurin</i>	3069
Structuring of manual of orientations and technical information for laundries of industries of animal products origin <i>Vania Eugênia da Silva, Simone Caldas Tavares Mafra, Cláudio Lísias Mafra and e Amaury Paulo de Souza</i>	3077
S-Saf&Hth 07 - Special Populations	
ERGOBERÇO® (Ergonomics Crib)- Evaluation of the prototype for a adaptation to safety's variables and comfort <i>Simone Caldas Tavares Mafra, Vania Eugênia da Silva and Luciana Aparecida de Oliveira</i>	3085
Exploring functions of the lost seeking devices for people with dementia <i>Yung-Ching Chen and Cherng-Yee Leung</i>	3093
From 'human being' to 'social subject': "unfreezing" ergonomics and the implications for understanding and intervening health-disease process <i>Karen Lange Morales and Gabriel Garcia-Acosta</i>	3101
S-Saf&Hth 08 - Workers' Health	
Risk evaluation and exposure control of mineral dust containing free crystalline silica: a study case at a quarry in the Recife Metropolitan Area <i>Mario Lira, E. Kohlman Rabbani, Beda Barkokébas and Eliane Lago</i>	3109
Design for worksystem safety using employees' perception about safety <i>J. Maiti</i>	3117
Forum: social network for the surveillance and prevention of workplace accidents <i>R.A.G. Vilela, I.M. Almeida, A. Nunes da Silva, M.H.P. Gomes, H. Prado, E. Buoso, M.D. Dias, S. Cavalcante and L.E. Lacorte</i>	3123

- Ports of Mucuripe and Pecém, Ceará, Brazil: restructuring process and its impact on workers' health
Regina Heloisa Maciel, Marselle Fernandes Fontenelle, Rosemary Cavalcante Gonçalves, Taise Araújo Lopes, Tuany Maria Sousa Moura and Felipe Mendes Monteiro 3130
- From prescribed to real rotations: a means of collective protection for the health of workers in a soft drink factory
R. Simões, F. Daniellou and A. Nascimento 3136
- S-Saf&Hth 09 - Human Factors and Ergonomics and Safety**
- Accidents related to the use of products and services in the city of São Luis, Brazil
Líssia Maria De Souza Dias, Raimundo Lopes Diniz and Lia Buarque de Macedo Guimarães 3143
- Tragedy on grade crossing: driver failure or systemic fragility?
Manoela Gomes Reis Lopes, Rodolfo Andrade de Gouveia Vilela, Ildeberto Muniz de Almeida, Odilamar Lopes Miotto, Mara Alice Batista Conti Takahashie and Fernanda Oliveira Perin 3148
- Human factors identification and classification related to accidents' causality on hand injuries in the manufacturing industry
Rosa María Reyes-Martínez, Aide Maldonado-Macías and Lilia Roselia Prado-León 3155
- Control centers design for ergonomics and safety
Leonardo Quintana, Cesar Lizarazo, Oscar Bernal, Jorge Cordoba, Claudia Arias, Magda Monroy, Carlos Cotrino and Olga Montoya 3164
- Methodological proposal for occupational health and safety actions in research laboratories with nanotechnologies activities
Luis Renato Balbão Andrade and Fernando Gonçalves Amaral 3174
- S-Saf&Hth 10 - Workplace Safety**
- Perceptual load in central and peripheral regions and its effects on driving performance: advertizing billboards
Hadas Marciano and Yaffa Yeshurun 3181

Effects of pushing height on trunk posture and trunk muscle activity when a cart suddenly starts or stops moving <i>Yun-Ju Lee, Marco J.M. Hoozemans and Jaap H. van Dieën</i>	3189
Cognitive structure of occupational risks represented by a perceptual map <i>M.M. Cardoso and R.A. Scarpel</i>	3196
Safety illusion and error trap in a collectively-operated machine accident <i>Ildeberto Muniz de Almeida, Hildeberto Nobre, Maria Dionisia do Amaral Dias, Rodolfo Andrade Gouveia Vilela</i>	3202
Human error assessment in electric power company of Serbia <i>Evica Stojiljkovic, Miroljub Grozdanovic and Predrag Stojiljkovic</i>	3207
Understanding safety culture by visualization of scenarios – development and evaluation of an interactive prototype <i>Mikael Blomé and Åsa Ek</i>	3213
S-Saf&Hth 11 – Safety	
Efficient and effective learning for safety from incidents <i>Roland Akselsson, Anders Jacobsson, Marcus Börjesson, Åsa Ek and Ann Enander</i>	3216
Planning crowd events to achieve high participant satisfaction <i>Victoria L. Kendrick, Roger A. Haslam and Patrick E. Waterson</i>	3223
Recovery and detachment between shifts, and fatigue during a twelve-hour shift <i>Christian Korunka, Bettina Kubicek, Roman Prem and Antonio Cvitan</i>	3227
How to increase safety in complex systems – an ongoing project <i>Håkan Alm, Anita Gärling, Sara Saellström Bonnevier and Mats Danielsson</i>	3234
Different roles in the quest for system resilience <i>Fábio Moraes Borges and Nilton Luiz Menegon</i>	3238
Circuit board accident – organizational dimension hidden by prescribed safety <i>Ildeberto Muniz de Almeida, Eduardo Buoso, Maria Dionisia do Amaral Dias and Rodolfo Andrade Gouveia Vilela</i>	3246

S-Saf&Hth 12 - Potpourri of Ergonomic Issues 1

- Human reliability and ergonomics: a literature review from 1963 to 2011
*João Alexandre Pinheiro Silva, Nilton Luis Menegon
 and Marly Monteiro de Carvalho* 3252
- An auditive protection for professional musicians
*Paula Emanuela Fernandes Cândido,
 Eugenio Andrés Díaz Merino and Leila Amaral Gontijo* 3260
- Study on the impact of exposure to noise in professional snipers
B. Barkokebas, E. Lago, B. Vasconcelos and E. Oliveira 3269
- An exploratory study on the conditions of health, safety and
 environmental affairs of very small and small-size enterprises in Brazil
*Carlos André Vaz, Roberto de Araujo Mendonça and
 Cláudia do Rosário Vaz Morgado* 3277
- Contributions of participatory ergonomics to the improvement of safety
 culture in an industrial context
Carine Lallemand 3284

S-Saf&Hth 13 - Potpourri of Ergonomic Issues 2

- Mapping of noise impact provoked by the execution of foundation
 piles at high rise building sites
*Adolpho Guido de Araújo, Alexandre Duarte Gusmão,
 Emilia Rahnemay Kohman Rabbani and Stela Paulino Fucale* 3291
- Ergonomic work analysis as a tool of prevention for the occupational
 safety and health management system
*Verônica de Miranda Prottes, Nádia Cristina Oliveira and
 Alessandra Barbosa de Oliveira Andrade* 3301
- Cognition and asynchronous distribution between human and machine
 building accidents
*Edgard Martins, Marcelo Soares, Lia Augusto and
 Laura Laura* 3308
- Parachuting harnesses comparative evaluation on energy distribution grids
*Paula Karina Hemberger, Ângela Regina Poletto and
 Leila Amaral Gontijo* 3313

How to evaluate the risks of work equipment and installations for health and safety? Research and activities of the German Committee for Plant Safety and consequences for regulation <i>R. Pieper</i>	3321
Human reliability in petrochemical industry: an action research <i>João Alexandre Pinheiro Silva and João Alberto Camarotto</i>	3325
Area – Slips, Trips and Falls	
S-STF 01 - Slips and Falls	
Effect of shoe type on descending a curb <i>Juff George, Michelle Heller and Michael Kuzel</i>	3333
Fundamental study on relationship between human injury probability due to fall and the fall height <i>Yasumichi Hino</i>	3339
Measuring step geometry using the Nose-to- Nose method: Validity and repeatability <i>Daniel Johnson and Gary Sloan</i>	3343
S-STF 02 - Slips, Trips & Falls: Footwear and Walking Surfaces	
Assessment of slip resistance under footwear materials, tread designs, floor contamination, and floor inclination conditions <i>Kai Way Li, Chih-Yong Chen, Ching Chung Chen and Liwen Liu</i>	3349
Effect of walking surface perturbation training on slip propensity and local dynamic stability <i>Jian Liu and Sukwon Kim</i>	3352
The development of a universal approach to testing of walkway slip resistance in the U.S. <i>P.E. James Flynn, A.R.M. Steven Di Pilla and P.E. Keith Vidal</i>	3355
Stair safety: bottom of flight illusion <i>Daniel Johnson</i>	3358
The stochastic distribution of available coefficient of friction on quarry tiles for human locomotion <i>Wen-Ruey Chang, Simon Matz and Chien-Chi Chang</i>	3363

Review of walking hazards for railroad workers <i>Robert O. Andres and Chip Wade</i>	3367
 Area – Visual Ergonomics	
S-VisErgo 01 - General aspects	
Applying research to practice: Generalist and specialist (visual ergonomics) consultancy <i>Jennifer Long and Airdrie Long</i>	3372
Temporal aspects of increases in eye-neck activation levels during visually deficient near work <i>Hans O. Richter, Lodin Camilla and Mikael Forsman</i>	3379
Lighting old age – how lighting impacts the ability to grow old in own housing, part one <i>Gunnar Horgen, Grethe Eilertsen and Helle Falkenberg</i>	3385
Eye- and neck/shoulder-discomfort during visually demanding experimental near work <i>Camilla Lodin, Mikael Forsman and Hans Richter</i>	3388
Co-variation in time between near-far accommodation of the lens and trapezius muscle activity <i>Mikael Forsman, Camilla Lodin and Hans Richter</i>	3393
Graphic and cultural aspects of pictograms: an information ergonomics viewpoint <i>Carla Galvão Spinillo</i>	3398
 S-VisErgo 02 - Task specific aspects	
A study of subjective visual disturbances in jewellery manufacturing <i>Amitabha De, U. Dhar, T. Virkar, C. Altekhar, W. Mishra, V. Parmar, M. Mutakekar, Rauf Iqbal and A.M. Chandra</i>	3404
Application of digital human modeling and simulation for vision analysis of pilots in a jet aircraft: a case study <i>Sougata Karmakar, Madhu Sudan Pal, Deepti Majumdar and Dhurjati Majumdar</i>	3412

Operative strategies of HLB's scouts of a citrus property within the State of Sao Paulo, Brazil <i>Glauca Helena Gonçalves and Nilton Luiz Menegon</i>	3419
Ergonomic analysis of safety signs: a focus of informational and cultural ergonomics <i>Janaina Cavalcanti and Marcelo Soares</i>	3427
Visual ergonomics interventions in mail sorting facilities <i>H. Hemphälä, G.-Å. Hansson, C. Dahlgvist and J. Eklund</i>	3433
Point Navigation Map method to track low-income mobile user's interaction <i>Leonardo Abreu and Anamaria de Moraes</i>	3438
Area – Work with Computer Systems	
S-WWCS 01 - Ergonomic Design and Evaluation of Complex Computer Systems 1	
Dosvox Usability: recommendations for improving interaction of blind people with the web using the system <i>Edson Rufino de Souza and Sydney Fernandes de Freitas</i>	3443
Cognitively automated assembly processes: a simulation based evaluation of performance <i>Marcel Ph. Mayer, Barbara Odenthal, Marco Faber and Christopher M. Schlick</i>	3449
Usability and decision support systems in emergency management <i>Mats Danielsson and Håkan Alm</i>	3455
State of the (net)work address developing criteria for applying social networking to the work environment <i>André Calero Valdez, Anne Kathrin Schaar and Martina Ziefle</i>	3459
A method for work modeling at complex systems: towards applying information systems in family health care units <i>Alessandro Jatobá, Paulo Victor R. de Carvalho and Amauri Marques da Cunha</i>	3468

S-WWCS 02 - Ergonomic Design and Evaluation of Complex Computer Systems 2

- The influence of the modality of telecooperation on performance and workload
Thomas Alexander, Claudius Pfendler, Jürgen Thun and Michael Kleiber 3476
- Use of graphical modality in a collaborative design distant setting
Stéphane Safin, Roland Juchmes and Pierre Leclercq 3484
- Invisible computer for collaborative design: evaluation of a multimodal sketch-based environment
Aurore Defays, Stéphane Safin, Françoise Darses, Anaïs Mayeur, Samia Ben Rajeb, Caroline Lecourtois, François Guéna and Pierre Leclercq 3494
- Visual Social Network Analysis: Effective Approach to Model Complex Human Social, Behaviour & Culture
Tareq Z. Ahram and Waldemar Karwowski 3504
- ## **S-WWCS 03 - Ergonomic Interface Design for Computer Users**
- Online epistemic communities: theoretical and methodological directions for understanding knowledge co-elaboration in new digital spaces
Françoise Détienne, Flore Barcellini, Michael Baker, Jean-Marie Burkhardt and Dominique Fréard 3511
- Design recommendations for the creation of icons for the elderly
Alexander Mertens, Christopher Brandl, Philipp Przybysz and David Koch-Körfges 3519
- Bivariate pointing movements on large touch screens: Investigating the validity of a refined Fitts' Law
Jennifer Bützler, Sebastian Vetter, Nicole Jochems and Christopher M. Schlick 3526
- How can multimodality be used to design usable interfaces in IPS² for older employees?
Ulrike Schmunzsch, Christine Sturm and Matthias Roetting 3533

Computer acceptance of older adults <i>Sibylle Nägle and Ludger Schmidt</i>	3541
Training users to counteract phishing <i>Christopher B. Mayhorn and Patrick G. Nyeste</i>	3549
S-WWCS 04 - Visual Ergonomics at Computer Work (Joint Session TC WWCS and TC Visual Ergonomics)	
Effects of screen filter on visibility of alphanumeric presentation on CRT and LCD monitors <i>Aleksandar Zunjic, Ljiljana Ristic and Dragan D. Milanovic</i>	3553
Incidence and risk factors for symptoms from the eyes among professional computer users <i>A. Toomingas, M. Hagberg, M. Heiden, H. Richter, K.E. Westergren and E. Wigaeus Tornqvist</i>	3560
VDU workstations and vision in post office and bank operators <i>Cheikh El-Bachir Tebboune and Bouhafis Mebarki</i>	3563
Risk factors for computer visual syndrome (CVS) among operators of two call centers in São Paulo, Brazil <i>Eduardo Costa Sa, Mario Ferreira and Lys Esther Rocha</i>	3568
Visual challenges using Visual Display Units (VDU) in office landscapes <i>Magne Helland and Gunnar Horgen</i>	3575
Visual ergonomics and computer work – is it all about computer glasses? <i>Christina Jonsson</i>	3577
SYMPOSIA	
S01 Warning Symposium Session 1: Technology-Based Warnings and Auditory Alert Characteristics	
Training time estimation to improve alarm reactions <i>James P. Bliss, Rachel Liebman and Eric Chancey</i>	3580

Multimodal urgency coding: auditory, visual, and tactile parameters and their impact on perceived urgency <i>Carryl L. Baldwin, Jesse L. Eisert, Andre Garcia, Bridget Lewis, Stephanie M. Pratt and Christian Gonzalez</i>	3586
Selection of a voice for a speech signal for personalized warnings: the effect of speaker's gender and voice pitch <i>Sheron Machado, Emilia Duarte, Júlia Teles, Lara Reis and Francisco Rebelo</i>	3592
Auditory backup alarms: distance-at-first- detection via in-situ experimentation on alarm design and hearing protection effects <i>Khaled Alali and John G. Casali</i>	3599
The impact of emotions and predominant emotion regulation technique on driving performance <i>G.M. Hancock, P.A. Hancock and C.M. Janelle</i>	3608
Virtual reality based therapy for post operative rehabilitation of children with cerebral palsy <i>Deepak Sharan, P.S. Ajeesh, R. Rameshkumar, M. Mathankumar, R. Jospin Paulina and M. Manjula</i>	3612
S02 Warning Symposium Session 2: Litigation and Warnings: The Role of an Expert Witness	
Ratings checklist for warnings: a prototype tool to aid experts in the adequacy evaluation of proposed or existing warnings <i>David R. Lenorovitz, S. David Leonard and Edward W. Karnes</i>	3616
Tire aging: a human factors analysis of failure to warn and inform <i>Michael S. Wogalter and Kenneth R. Laughery</i>	3624
Ride-on lawnmowers warnings: Slope measurements and safety-by-separation <i>Edward W. Karnes, S. David Leonard and David R. Lenorovitz</i>	3629
What should I do? – A study about conflicting and ambiguous warning messages <i>Emilia Duarte, Francisco Rebelo, Júlia Teles and Paulo Noriega</i>	3633

**S03 ErgoDesignForum: Ergonomics and Design Cooperation,
fear, attraction, temptation 1**

- Users/consumers differences regarding
ergonomics and design theory and practice
Pierre-Henri Dejean and Peter Wagstaff 3641

S04 Ergonomics and Education

- Ergonomics content in the physical education
teacher's guide in Rwanda
*Manobhiram Nellutla, Hetal Patel, Aline Kabanda
and Assuman Nuhu* 3646

- International English and ergonomics: a romance in the making?
Roddy Kay 3652

- Physical and postural aspects of teachers during work activity
Nilson Rogério da Silva and Maria Amélia Almeida 3657

- The deaf and the classroom design: a contribution of the built
environmental ergonomics for the accessibility
Laura Bezerra Martins and Denise Maria Simões Freire Gaudiot 3663

- Cross-disciplinary problem-solving workshop: a pedagogical
approach to anticipate ergonomist engineering design collaboration
*Elisabeth Brunier, Michel Le Chapellier
and Pierre Henri Dejean* 3669

S05 Ergonomics and Education

- Integrating community ergonomics with educational ergonomics – designing
community systems to support classroom learning
Thomas J. Smith 3676

- Ergonomic analysis for elementary school teachers. Preliminary
trial for elementary schools in the province of Buenos Aires
Gabriela Cuenca and Patricio Nussbold 3685

- Analysis of environmental factors affecting the quality of teacher's
life of public schools from Umuarama
Bruna Evellyn Costa and Nicéia Luzia Selete Silva 3693

Ergonomics and Education as a Strategy for Sustainable Development in Business <i>Dierci Marcio Silveira and Erico Lourenço Brandão</i>	3701
<i>Burnout syndrome, working conditions, and health: a reality among public high school teachers in Brazil</i> <i>Ângela Maria C. Santana, Dione De Marchi, C.G. Luiz, Yassana M. Girondoli and Andrés Chiappeta</i>	3709
S06 Night, Shiftwork and Health effects	
Irregular working times and metabolic disorders among truck drivers: a review <i>Elaine C. Marqueze, Melissa A. Ulhôa and Claudia R.C. Moreno</i>	3718
Need for recovery from work and sleep-related complaints among nursing professionals <i>Aline Silva-Costa, Rosane Harter Griep, Frida Marina Fischer and Lúcia Rotenberg</i>	3726
Morbidity among nursing personnel and its association with working conditions and work organization <i>S. Vasconcelos, E. Marqueze, L. Gonçalves, L. Lemos, L. Araújo, F.M. Fischer and C.R.C. Moreno</i>	3732
Musculoskeletal reported symptoms among aircraft assembly workers: a multifactorial approach <i>Fabício Augusto Menegon and Frida Marina Fischer</i>	3738
Work ability among hospital food service professionals: multiple associated variables require comprehensive intervention <i>Frida Marina Fischer and Maria Carmen Martinez</i>	3746
S07 Human Factors and Ergonomics in the Building and Construction Industry 1	
Relationship between construction workers' musculoskeletal disorders and occupational health service activities <i>Savinainen Minna and Nyberg Mika</i>	3753
Flow diagram analysis of electrical fatalities in construction industry <i>Chia-Fen Chi, Yuan-Yuan Lin and Mohamad Ikhwan</i>	3757

- Predicting long-term absenteeism from work in construction industry: a longitudinal study
Peter Hoonakker and Cor van Duivenbooden 3765
- The evaluation of team lifting on physical work demands and workload in ironworkers
Henk F. van der Molen, Steven Visser, P. Paul F.M. Kuijer, Gert Faber, Marco J.M. Hoozemans, Jaap H. van Dieën and Monique H.W. Frings-Dresen 3771
- Assessment method of accessibility conditions: how to make public buildings accessible?
Isabela Fernandes Andrade and Vera Helena Moro Bins Ely 3774
- S08 Human Factors and Ergonomics in the Building and Construction Industry 2**
- Ergonomic analysis of the use of open-plan offices in Brazilian public sector offices
Ana Paula Lima Costa and Vilma Villarouco 3781
- Study and analysis of occupational risk factors for ergonomic design of construction worksystems
Ratri Parida and Pradip Kumar Ray 3788
- Evidence-based exposure criteria for workrelated musculoskeletal disorders as a tool to assess physical job demands
P. Paul F.M. Kuijer, Henk F. van der Molen and Monique H.W. Frings-Dresen 3795
- Construction and application of an indicator system to assess the ergonomic performance of large and medium-sized construction companies
Isabela Xavier Barbalho Bezerra and Ricardo José Matos de Carvalho 3798
- Outcomes of a revised apprentice carpenter fall prevention training curriculum
Bradley Evanoff, Vicki Kaskutas, Ann Marie Dale, John Gaal, Mark Fuchs and Hester Lipscomb 3806

S09 Human Factors and Ergonomics in the Building and Construction Industry 3

Casting an ergonomic eye on university libraries <i>Nicole Ferrer and Vilma Villarouco</i>	3809
The impact of a 'green' building on employees' physical and psychological wellbeing <i>Andrew Thatcher and Karen Milner</i>	3816
Using process evaluation to determine effectiveness of participatory ergonomics training interventions in construction <i>Ann Marie Dale, Lisa Jaegers, Brian Buchholz, Laurie Welch and Bradley A. Evanoff</i>	3824
Ergonomic aspects to be considered in planning public spaces destined for elderly people <i>Marcella Viana Portela de Oliveira Cunha, Angelina Dias Leão Costa and Mariama da Costa Ireland</i>	3827
Anthropometric evaluation of internal horizontal circulation environments <i>Sadi Seabra and Bruno Barros</i>	3834
Accessibility for all: going from theory to practice <i>Isabela Andrade, Vanessa Dorneles and Vera Helena Moro Bins Ely</i>	3840
S10 Systems Ergonomics	
Systems approaches to risk assessing healthcare, how far have we come? <i>Peter Buckle</i>	3847
Sociotechnical systems approach to healthcare quality and patient safety <i>Pascale Carayon</i>	3850
Performance-based management and quality of work: an empirical assessment <i>Pierre Falzon, Adelaide Nascimento, Corinne Gaudart, Cécile Piney, Marie-Anne Dujarier and Jean-François Germe</i>	3855
Fundamentals of systems ergonomics <i>John R. Wilson</i>	3861

S11 Ergonomics and design for sustainability

- Strategies and arguments of ergonomic design for sustainability
Antonio Marano, Giuseppe Di Bucchianico and Emilio Rossi 3869
- Toward a transdisciplinary approach of ergonomic design for sustainability
Giuseppe Di Bucchianico, Antonio Marano and Emilio Rossi 3874
- Ergonomics and sustainability in the design of everyday use products
Francesca Tosi 3878
- Ergonomics and design for sustainability in healthcare: ambient assisted living and the social-environmental impact of patients lifestyle
Giuseppe Andreoni, Pelin Arslan, Fiammetta Costa, Sabrina Muschiato and Maximiliano Romero 3883
- Sustainability and accessibility: the design for all approach
Isabella Steffan 3888

S12 Human Factors and Ergonomics for Organizational Sustainability

- Early variability in the conceptualization of “sustainable development and human factors”
Andrew Thatcher 3892
- Defining elements of sustainable work systems – a system-oriented approach
Klaus Fischer and Klaus J. Zink 3900
- Ergonomics and sustainability – challenges from global supply chains
Peter Hasle and Per Langaa Jensen 3906
- Shared services centers and work sustainability: which contributions from ergonomics ?
Justine Arnoud and Pierre Falzon 3914
- Ergonomic principles and tools for best interdisciplinary psycho-physical stress prevention
Dott. Luigi Dal Cason 3920
- Innovation in user-centered skills and performance improvement for sustainable complex service systems
Waldemar Karwowski and Treq Z. Ahram 3923

**S13 Contribution for IEA/WHO toolkit for WMSDs prevention 1:
General contributions for a IEA/WHO toolkit devoted to MSD prevention**

- A toolkit for MSDs prevention - WHO and IEA context
David C. Caple 3930
- Conceptual framework for development of a toolkit for prevention
of work-related musculoskeletal disorders
Wendy Macdonald 3933
- IEA/WHO toolkit for WMSDs prevention: criteria and practical
tools for a step by step approach
Enrico Occhipinti and Daniela Colombini 3937
- Categorizing job physical exposures using simple methods
Stephen Bao and Barbara Silverstein 3945

**S14 Contribution for IEA/WHO toolkit for WMSDs prevention 2:
Experiences in using simple tools for biomechanical risk assessment
in craftwork, small industries and difficult sectors with high task variability**

- A simple tool for preliminary hazard identification and quick assessment in
craftwork and small/medium enterprises (SME)
Colombini Daniela, E. Occhipinti and G. Di Leone 3948
- Hazard identification and pre-map with a simple specific tool: synthesis
of application experience in handicrafts in various productive sectors
*Daniela Colombini, Enrico Occhipinti, Raffaele Peluso and
Loretta Montomoli* 3956
- Biomechanical overload in multiple tasks with weekly and annual cycle:
practical experiences in the field of cleaning and packaging of fruit
Daniela Colombini and E. Occhipinti 3964
- Study of biomechanical overload in urban gardeners of Barcelona:
application of analytical models for risk exposure evaluation in annual
working cycle
*Enrique Alvarez-Casado, Aquiles Hernandez-Soto, Sandoval Tello
and Rosa Gual* 3973
- Application of the OCRA Method in the sugar cane harvest and its
repercussion on the workers' health. Preliminary study
Facci Ruddy, Marcatto Eduardo and Santino Edoardo 3981

**S15 Contribution for IEA/WHO toolkit for WMSDs prevention 3:
Experiences in applying tools for managing MSD with special reference
to HARM and KIM tools**

- New risk assessment tools in The Netherlands
Heleen de Kraker and Marjolein Douwes 3984
- New tools in Germany: development and appliance of the first two
KIM ("lifting, holding and carrying" and "pulling and pushing") and
practical use of these methods
Ulf Steinberg 3990
- Evaluation of objectivity, reliability and criterion validity of the Key
Indicator Method for Manual Handling Operations (KIM-MHO), draft 2007
*André Klußmann, Hansjürgen Gebhardt, Monika Rieger,
Falk Liebers and Ulf Steinberg* 3997
- HARM overview and its application: some practical examples
Marjolein Douwes and Heleen de Kraker 4004

S16 World engineering anthropometry resource, tools and applications

- A protocol for evaluating the accuracy of 3D body scanners
*Makiko Kouchi, Masaaki Mochimaru,
Bruce Bradtmiller, Hein Daanen, Peng Li,
Beatriz Nacher and Yunja Nam* 4010
- Where is the human waist? Definitions, manual compared to scanner
measurements
Daisy Veitch 4018
- Comparing swimsuits in 3D
*Erik van Geer, Johan Molenbroek, Sander Schreven,
Lenneke deVoogd-Claessen and Huib Toussaint* 4025
- A multidimensional approach to the generation of helmets' design criteria:
a preliminar study
*S. Alemany, J. Olaso, B. Nacher, M. Gil, A. Hernández
M. Pizá and C. Solves* 4031
- Measurement of breast volume using body scan technology
(computer-aided anthropometry)
*Daisy Veitch, Karen Burford, Phil Dench, Nicola Dean
and Philip Griffin* 4038

S17 Anthropometric data acquisition and use

- Photogrammetry procedures applied to anthropometry
*Maria Lúcia Leite Ribeiro Okimoto and
 Alison Alfred Klein* 4046
- Using digital photogrammetry to conduct an anthropometric analysis
 of wheelchair users
Helda Oliveira Barros and Marcelo Márcio Soares 4053
- Automatic anthropometric personalization of a digital human model
 from a set of subject's photographs
Jean-Pierre Verriest 4061
- An anthropometric survey using digital photogrammetry: a case
 study in Recife, Pernambuco, Brazil
Bruno Barros and Marcelo Soares 4069
- Structuring software anthropometric variables on CD Rom as a
 facilitator of the process of design of work situations
*Sharinna Venturim Zanuncio, Simone Caldas Tavares Mafra,
 Carlos Emilio Barbosa Antônio, Jugurta Lisboa Filho,
 Elza Maria Vidigal Guimarães, Vania Eugênia da Silva,
 Amaury Paulo de Souza and Luciano José Minette* 4076
- S18 Anthropometric survey**
- Sizing up Australia: toward a national sizing survey
Daisy Veitch, Verna Blewett and David Caple 4083
- How does the size and shape of local populations in China compare
 to general anthropometric surveys currently used for product design?
Nathan Daniell, François Fraysse and Gunther Paul 4088
- Anthropometric analysis of wheelchair users: methodological factors
 which influence interpopulational comparison
Helda Oliveira Barros and Marcelo Márcio Soares 4091
- Computer re-sampling for demographically representative user
 populations in anthropometry: a case of doorway and clear floor
 space widths
Victor Paquet, Caroline Joseph and Clive D'Souza 4098

S19 Human Factors and Ergonomics in the Building and Construction Industry 4

- The ergonomic and legal aspects of the heritage of the state of Pernambuco - Brazil
Terezinha de Jesus Pereira da Silva and Augusto Eugenio Paashaus Neto 4102
- Communication of Ergonomics in building and construction
Viveca Wiberg 4111
- From usability requirement to technical specifications for hand-held tools and materials: an applied research in the construction field
Gabriella Duca and Erminia Attaianese 4116
- Accessibility in the Fortress of São José da Ponta Grossa - Brazil
J. Callado and A. Poletto 4121
- Analysis of accessibility for buildings of a graduation school – an experiment in ergonomics training curriculum
A.S.G. Acioly, M.D. Oliveira and V.H.F. Freitas 4124

S20 Human Factors and Ergonomics in the Building and Construction Industry 5

- Organizational factors related to occupational accidents in construction
J.M. Jackson Filho, E.D. Fonseca, F.P.A. Lima and F.J.C.M. Duarte 4130
- Young workers in the construction industry and initial OSH-training when entering work life
Kari Anne Holte and Kari Kjestveit 4137
- Overview of ergonomics built environment
Ana Paula Lima Costa, Fábio Campos and Vilma Villarouco 4142
- Methodological proceedings to evaluate the physical accessibility in urban historic sites
Gabriela Sousa Ribeiro, Laura Bezerra Martins and Circe Maria Gama Monteiro 4149

Risk management project for work with precast concrete shells
Linda Rose 4157

S21 Human Factors and Ergonomics in the Building and Construction Industry 6

The elderly in the shopping centers: the usability study of semipublic spaces as attractiveness generator
*Maria Cristina Bittencourt,
Vera Lúcia Duarte do Valle Pereira
and Waldemar Pacheco* 4163

Does team lifting increase the variability in peak lumbar compression in ironworkers?
*Gert Faber, Steven Visser, Henk F. van der Molen,
P. Paul F.M. Kuijter, Marco J.M. Hoozemans,
Jaap H. van Dieën and Monique H.W. Frings-Dresen* 4171

Accessibility in collective housing for the elderly: a case study in Portugal
Marie Monique Bruère Paiva, and Vilma Villarouco 4174

Impact of lightweight and conventional jackhammers on the operator
*Naira Campbell-Kyureghyan, Gurjeet Singh,
Wilkistar Otieno and Karen Cooper* 4180

S22 Transport Ergonomics and Human Factors I

Naturalistic observation of drivers' interactions while overtaking on an undivided road
*Evangelia Portouli, Dimitris Nathanael,
Nicolas Marmaras and Vassilis Papakostopoulos* 4185

Comparison of two human-machine-interfaces for cooperative maneuver-based driving
*Benjamin Franz, Michaela Kauer, Anton Blanke,
Michael Schreiber, Ralph Bruder and Sebastian Geyer* 4192

Safety implications of infotainment system use in naturalistic driving
Miguel A. Perez 4200

Using naturalistic driving films as a design tool for investigating driver requirements in HMI design for ADAS
Minjuan Wang, Dong Sun and Fang Chen 4205

A method to investigate drivers' acceptance of Blind Spot Detection System® <i>Giulio Francesco Piccinini, Anabela Simões, Carlos Manuel Rodrigues and Miguel Leitão</i>	4213
A Comprehensive Literature Review of the Pelvis and the Lower Extremity FE Human Models under Quasi-static Conditions <i>R.M.A. Al-Dirini, D. Thewlis and G. Paul</i>	4218
S23 Transport Ergonomics and Human Factors II	
Keeping rail on track: preliminary findings on safety culture in Australian rail <i>Verna Blewett, Sophia Rainbird, Jill Dorrian, Jessica Paterson and Marcus Cattani</i>	4230
Understanding human factors in rail engineering: re-analysis of detailed, qualitative data on functions and risks <i>Brendan Ryan, John R. Wilson and Alex Schock</i>	4237
Indonesian railway accidents – utilizing Human Factors Analysis and Classification System in determining potential contributing factors <i>Hardianto Iridiastadi and Zulfa Fitri Ikatrinasari</i>	4246
S24 Transport Ergonomics and Human Factors 3	
Designing dynamic distributed cooperative Human-Machine Systems <i>A. Lüdtke, D. Javaux, F. Tango, R. Heers, K. Bengler and C. Ronfle-Nadaud</i>	4250
User acceptance of cooperative maneuver-based driving – a summary of three studies <i>Michaela Kauer, Benjamin Franz, Michael Schreiber, Ralph Bruder and Sebastian Geyer</i>	4258
How shall we design the future vehicle for Chinese market <i>Fang Chen, MinJuan Wang, Xi Chan Zhu and Jiaqi Li</i>	4265
DriveID: safety innovation through individuation <i>Ben Sawyer, Grace Teo and Mustapha Mouloua</i>	4273
Assisted entry mitigates text messaging-based driving detriment <i>Benjamin D. Sawyer and Peter A. Hancock</i>	4279

S25 Gender, work activity and risk: what are the implications for intervention?

- Effects of extended work shifts on employee fatigue, health, satisfaction, work/family balance, and patient safety
Madeleine Estryn-Béhar and Beatrice I.J.M. Van der Heijden 4283
- When gender bumps into health and safety training: working conditions, readings and challenges drawn from a case study in an industrial chemicals company
Ricardo Vasconcelos, Sandra Teixeira, Joana Castelhana and Marianne Lacomblez 4291
- Thinking about gender, thinking about a *common space* of observation and discussion of the work activity of the other: the case of bus drivers
Liliana Cunha, Sónia Nogueira and Marianne Lacomblez 4297
- S26 Gender issues in various occupations**
- Shift work - problems and its impact on female nurses in Udaipur, Rajasthan India
H. Rathore, K. Shukla, S. Singh and G. Tiwari 4302
- Women's working conditions in hospital cleaning: a case study
Silvana Salerno, Valentina Kolman, Lucilla Livigni, Andrea Magrini, Maria Giuseppina Bosco and Irene Figà Talamanca 4315
- Gender differences on the job satisfaction in the phase of implementing advanced manufacturing technology in the Chinese manufacturing firms
Na Yu, Li Ming Shen and Siegfried Lewark 4320
- Influence of gender on the prevalence of Rsi/ WRULD in meat-packing plants
P. Reis, A. Moro, Eugenio Merino and J. Vilagra 4323
- Gender and age do not influence the ability to work
Rosimeire Simprini Padula, Luciana do Socorro da Silva Valente, Mónica Vasconcelos de Moraes, Luciana Dias Chiavegato and Cristina Maria Nunes Cabral 4330

S27 Gender issues in agricultural work

- Gender involvement in manual material handling (mmh) tasks in agriculture and technology intervention to mitigate the resulting musculoskeletal disorders
Suman Singh, Neelima Sinwal and Hemu Rathore 4333
- Intervention of gender friendly land preparation technologies for drudgery reduction of hill farm women
Jatinder Kishtwaria and Aruna Rana 4342
- Ergonomic interventions in weeding operations for drudgery reduction of hill farm women of India
Jatinder Kishtwaria and Aruna Rana 4349
- Migrant women farm workers in the occupational health literature
Rima R. Habib and Fadi A. Fathallah 4356
- Assessment of energy balance of Indian farm women in relation to their nutritional profile in lean and peak agricultural seasons
Suman Singh, Sushma Sinwal and Hemu Rathore 4363

S28 Ergonomics in automotive industry

- Integration of time as a factor in ergonomic simulation
Mario Walther and Begoña Toledo Muñoz 4372
- Metabolic impact of shift work
Ioná Zalcman Zimberg, Silvio A. Fernandes, Cibele Aparecida Crispim, Sergio Tufik and Marco Tulio de Mello 4376
- Ergonomic risk assessment with DesignCheck to evaluate assembly work in different phases of the vehicle development process
Winter Gabriele, G. Schaub Karlheinz, Großmann Kay, Laun Gerhard, Landau Kurt and Bruder Ralph 4384
- The charge of ergonomics – A model according to the influence of ergonomic workplace design for economical and efficient indicators of the automotive industry
Nicole Neubert, Ralph Bruder and Begoña Toledo 4389

- Assessing driver's mental representation of Adaptive Cruise Control (ACC) and its possible effects on behavioural adaptations.
*Giulio Francesco Piccinini, Anabela Simões,
 Carlos Manuel Rodrigues and Miguel Leitão* 4396
- Managing ergonomics in the development of rotation between workstations in the automotive industry. A balance between health and traceability of tasks
Rodrigo Filus and Luciana Partel 4402
- S29 Original approach for a session on physical workload in automotive industries 1**
- Prevention of MSD by means of ergonomic risk assessment (tools) in all phases of the vehicle development process
*Schaub Karlheinz, Kugler Michaela, Bierwirth Max,
 Simm-Behrendt Andrea and Bruder Ralph* 4409
- Global ergonomics strategy in Volkswagen: from the product construction, over the planning until the serial process
Begoña Toledo 4413
- Ergonomics at Volkswagen Brasil. Multidisciplinary work to equalize Health, Productivity and Quality.
*Rodrigo Filus, Rodrigo Wruca, Vanessa Charleaux,
 Auro Ortega, Claudio Ferreira, Leandro Jesus,
 Anderson Stramari, Michel Neufel and Uyara Maia* 4418
- ERGO-MTM model: an integrated approach to set working times based upon standardized working performance and controlled biomechanical load
G. Caragnano and I. Lavatelli 4422
- Interactive production planning and ergonomic assessment with Digital Human Models – Introducing the Editor for Manual Work Activities (ema)
*Lars Fritzsche, Wolfgang Leidholdt, Sebastian Bauer,
 Thomas Jäckel and Adrian Moreno* 4428

S30 Original approach for a session on physical workload in automotive industries 2

MultipLa – a tool for the combined overall estimation of various types of manual handling tasks

Schaub Karlheinz, Bierwirth Max, Kugler Michaela and Bruder Ralph

4433

Correlations in between EAWS and OCRA Index concerning the repetitive loads of the upper limbs in automobile manufacturing industries

Ivan Lavatelli, Karlheinz Schaub and Gabriele Caragnano

4436

Ergonomics and workplace design: application of Ergo-UAS System in Fiat Group Automobiles

M. Vitello, L.G. Galante, M. Capoccia and G. Caragnano

4445

S31 NIOSH Consortium Studies of Distal Upper Extremity Musculoskeletal Disorders

Risk factors for incident carpal tunnel syndrome: results of a prospective cohort study of newly-hired workers

Bradley Evanoff, Ann Marie Dale, Elena Deych, Daniel Ryan and Alfred Franzblau

4450

S32 Changing Mines for Healthier People

Addressing the cultural complexity of OHS in the Australian mining industry

Christine Aickin, Andrea Shaw, Verna Blewett, Laurie Stiller and Stephen Cox

4453

Using MSD prevention for cultural change in mining: Queensland Government/Anglo Coal Industry partnership

Trudy Tilbury and Liz Sanderson

4457

Application of ergonomics principles in underground mines through the Occupational Safety and Health Management System – OSHMS OHSAS 18.001:2007

Agnaldo Fernando Vieira de Arruda and Leila Maral Gontijo

4460

S33 Healthcare Information Technology Implementation

Challenges to care coordination posed by the use of multiple health IT applications

Pascale Carayon, Bashar Alyousef, Peter Hoonakker, Ann Schoofs Hundt, Randi Cartmill, Janet Tomcavage, Andrea Hassol, Kimberly Chaundy, Sharon Larson, Jim Younkin and James Walker

4468

Computer decision support tools in primary care

Peter Hoonakker, Adjhaporn Khunlertkit, Matthew Tattersal and Jon Keevil

4474

Considering social ergonomics: the effects of HIT on interpersonal relationships between patients and clinicians

Enid Montague and Onur Asan

4479

Can we make health IT safe enough for patients?

Robert L. Wears

4484

Using HIT to deliver integrated care for the frail elderly in the UK: current barriers and future challenges

Patrick Waterson, Ken Eason, Dylan Tutt and Mike Dent

4490

Spin your science into gold: direct to consumer marketing within social media platforms

David Egilman and Nicholas M. Druar

4494

S34 Human-Centered Design of Life-Critical Systems 1

What do we mean by Human-Centered Design of Life-Critical Systems?

Guy A. Boy

4503

Complexity analysis of the Next Gen Air Traffic Management System: trajectory based operations

Rhonda Lyons

4514

Improving flight condition situational awareness through Human Centered Design

Carol Craig

4523

The development of a virtual camera system for astronaut-rover planetary exploration

Donald W. Platt and Guy A. Boy

4532

S35 Human-Centered Design of Life-Critical Systems 2

- Advanced interaction media in nuclear power plant control rooms
Lucas Stephane 4537
- Automations influence on nuclear power plants: a look at three accidents and how automation played a role
Kara Schmitt 4545
- Human-machine cooperation: a solution for life-critical Systems?
Patrick Millot and Guy A. Boy 4552
- Rethinking healthcare as a safety-critical industry
Robert L. Wears 4560

S36 Ergonomics Analysis of Work and Training: Part 3 - Analysis, evaluation, and dissemination of effective training practices

- Evaluating work and training within an intercommunicating process of change: reflections drawn from a case study on a chemicals industrial company in Portugal
Ricardo Vasconcelos, Daniel Silva, Ricardo Pinto and Sérgio Duarte 4564
- Ergonomic analysis of work activity for the purpose of developing training programs: the contribution of ergonomics to vocational didactics
Sylvie Ouellet 4572
- Instruments of trainers' activity: the use of referentials in processes of recognition and validation of prior learning
Joana Fernandes and Marta Santos 4577
- Proposal for training of workers and researchers as from the participatory return of research results in workers' health
Joseane Pessanha Ferreira, Claudia Osorio da Silva and e Lúcia Rotenberg 4584
- "Meetings on the work": an analysis device for understanding the articulation between outsourcing and other organizational innovations
Denise Alvarez and Marcelo Figueiredo 4590

S37 ANTHROPOMETRY APPLIED TO ERGONOMIC DESIGN

- Using experimental design to define boundary manikins
Erik Bertilsson, Dan Högberg and Lars Hanson 4598

Anthropometric change: implications for office ergonomics <i>Claire C. Gordon and Bruce Bradtmiller</i>	4606
Influence of anthropometry on meat-packing plant workers: an approach to the shoulder joint <i>Pedro Ferreira Reis, Luis Sérgio Peres, Adriana Seára Tirloni, Diogo Cunha dos Reis, Jansen Atier Estrázulas, Mateus Rossato and Antônio Renato Pereira Moro</i>	4612
1D and 3D anthropometric data application on public transport vehicle layout and on oil and gas laboratories work environment design <i>F.C.H. Pastura, C.P. Guimarães, M.C.P. Zamberlan, G.L. Cid, V.S. Santos, P. Streit, A.G. Paranhos, R.T. Cobbe, K.T. Cobbe and D.S. Batista</i>	4618
Determining anthropometric variables as a tool in the preparation of furniture and designs of interior spaces: the case of children 6 to 11 years old of Vicosá, State of Minas Gerais, Brazil <i>Sharinna Venturim Zanuncio, Simone Caldas Tavares Mafra, Carlos Emilio Barbosa Antônio, Jugurta Lisboa Filho, Elza Maria Vidigal Guimarães, Vania Eugênia da Silva, Amaury Paulo de Souza and Luciano José Minette</i>	4626
Accessibility and ergonomic analysis for banking cash <i>A. Kaizer, F. Ramos and E. Ferro</i>	4633
S38 Ergonomics Analysis of Work and Training – Gender considerations	
Police training course for agents – entry into the profession and also into the distinction between men and women <i>Joana Castelhana, Marianne Lacomblez, Marta Santos and Camilo Valverde</i>	4637
Safe and healthy integration into semiskilled jobs: does gender matter? <i>Marie Laberge, Nicole Vézina and Johanne Saint-Charles</i>	4642
The entry of women in predominantly male professions: when training supports the search of alternative ways of organizing work time <i>Sônia Nogueira, Marianne Lacomblez, Marta Santos, Liliana Cunha and Joana Castelhana</i>	4650
Health and safety of students in vocational training in Quebec: a gender issue? <i>Céline Chatigny, Jessica Riel and Livann Nadon</i>	4653

- The use of a website as an interaction and training device in health, gender and work in schools
Jussara Brito, Mary Yale Neves, Amanda Ornela Hyppolito, Denise Alvarez, Edil Ferreira da Silva, Hélder Muniz, Kátia Reis de Souza, Maristela França and Milton Athayde 4661

S39 Ergonomic aspects of Clinical and Surgical Procedures

- Disparities between industrial and surgical ergonomics
F. Jacob Seagull 4669

- Standardization of surgical procedures for identifying best practices and training
T. Armstrong, D. Yu, A. Frischknecht, R. Minter, P. Andreatta and S. Kasten 4673

- Distal upper extremity musculoskeletal risk factors associated with colonoscopy
David Rempel, David Lee and Amandeep Shergill 4680

- Ergonomic considerations in natural orifice transluminal endoscopic surgery (NOTES): A case study
Cristina Tessier, Likun Zhang and Caroline G.L. Cao 4683

- Ergonomic risk assessment of nasogastric tube placement and implications for design and training
Oliver Anderson, Peter Buckle and George Hanna 4689

- Ergonomics of novices and experts during simulated endotracheal intubation
Adam de Laveaga, Michael C. Wadman, Laura Wirth and M. Susan Hallbeck 4692

S40 Ergonomics for Persons with Disabilities 1

- Review of practices for keeping people with disabilities in employment: moving beyond the concept of compensation to implement a developmental approach
Gaëtan Bourmaud and Xavier Rétaux 4699

- Ergonomics and the inclusion of people with disabilities in a Brazilian workplace
Francisco de Paula Nunes Sobrinho and Uilielma Ferreira de Lucena 4709

Including the people with disabilities at work: a case study of the job of bricklayer in civil construction in Brazil <i>L.B. Martins, B. Barkokébas and B.M. Guimarães</i>	4716
Issues concerning scientific production of including people with disabilities at work <i>B.M. Guimarães, L.B. Martins and B. Barkokébas</i>	4722
S41 Ergonomics for Persons with Disabilities 2	
Ergonomic aspects of design of a cap with electronic obstacle detector for use by visually impaired people <i>N. Nascimento, R. Salvado, P. Araújo and F. Borges</i>	4729
Ergonomics, design universal and fashion <i>S.B. Martins and L.B. Martins</i>	4733
Design of therapeutic clothing for sensory stimulation of children with psychomotor delay <i>Ângela Pires and Rui Miguel</i>	4739
Colour and inclusivity: a visual communication design project with older people <i>Fernando Moreira da Silva</i>	4746
Chemical toilet for persons with disabilities: proposal for an urban furniture affordable <i>Ademario Santos Tavares and Glielson Nepomuceno Montenegro</i>	4754
Inclusive design - assistive technology for people with cerebral palsy <i>Regina Heidrich and Patrícia Bassani</i>	4762
S42 Ergonomics for Persons with Disabilities 3	
Inclusion of people with disabilities in the production system of a footwear industry <i>R.S. Bitencourt and L.B. de M. Guimarães</i>	4767
Research the mobile phone operation interfaces for vision-impairment <i>Yen-Ting Yao and Cherng-Yee Leung</i>	4775

S43 Prevention of work-related musculoskeletal disorders in Brazil: results, challenges, and impressions of different experiences (Part I)

Comparison of randomized and nonrandomized controlled trials evidence regarding the effectiveness of workplace exercise on musculoskeletal pain control

*R.F.C. Moreira, F.A. Foltran, F. Albuquerque-Sendín,
M.C. Mancini and H.J.C.G. Coury*

4782

Teaching ergonomics to undergraduate physical therapy students: new methodologies and impressions of a Brazilian experience

Leticia Holtz Barbosa and Maria Helena Câmara Pinheiro

4790

Postural analysis and psychosocial measurements of federal civil servants of an institution of higher education

*Rodrigo Carregaro, Juliano Falcão, Karlla Massuda,
Daniely Masunaga, Camila Sinzato, Ana Beatriz de Oliveira
and Rosimeire S. Padula*

4795

Musculoskeletal disorders and psychosocial risk factors among workers of the aircraft maintenance industry

*Helen Cristina Nogueira, Ana Carolina Parise Diniz,
Dechristian França Barbieri, Rosimeire Simprini Padula,
Rodrigo Luiz Carregaro and Ana Beatriz de Oliveira*

4801

Are cutout handles used when available in real occupational settings? Description of grips and upper extremities movements during industrial box handling

*Luciana C.C.B. Silva, Ana B. Oliveira, Michele E.R. Alem,
Luis C. Paschoarelli and Helenice J.C.G. Coury*

4808

S44 Prevention of work-related musculoskeletal disorders in Brazil: results, challenges, and impressions of different experiences (Part 2)

The influence of the tasks characteristics in physical performance and psychosocial aspects of workers

*Rosimeire Simprini Padula, Juliana Neves Rosina,
Cristina Maria Nunes Cabral, Sandra Maria Sbeghen Ferreira
de Freitas and Luciana Dias Chiavegato*

4813

Furniture dimensions and postural overload for schoolchildren's head, upper back and upper limbs <i>Mariana Vieira Batistão, Anna Cláudia Sentanin, Cristiane Shinohara Moriguchi, Gert-Åke Hansson, Helenice Jane Cote Gil Coury and Tatiana de Oliveira Sato</i>	4817
Influence of door handles design in effort perception: accessibility and usability <i>Luis Carlos Paschoarelli, Raquel Santos and Paula Bruno</i>	4825
Brazilian version of an assessment tool for the evaluation of work organizational aspects (AOT) by the NIOSH WMSD Research Consortium: Translation and application in industrial sectors <i>Mariana V. Batistão, Carolina C. Alcântara, Isabella G. Pissinato, Michele E.R. Alem and Helenice J.C.G. Coury</i>	4830
Need for recovery assessment among nursing professionals and call center operators <i>Cristiane Shinohara Moriguchi, Taísa Trevizani, Roberta de Fátima Carreira Moreira, Letícia Bergamin Januário, Ana Beatriz de Oliveira and Helenice Jane Cote Gil Coury</i>	4838
Psychosocial risks: acting upon the organisation by ergonomic intervention <i>Johann Petit and Bernard Dugué</i>	4843
S45 Interactive research as a means for ergonomic improvement of large-scale work systems	
Outcome measures and prognosis of WRMSD <i>Jerrish A. Jose</i>	4848
Supervisors in ergonomic change of meat cutting work <i>K. Vogel</i>	4850
New ways of organizing product introductions <i>Martina Berglund, Ulrika Harlin, Maria Gustavsson and Kristina Säfsten</i>	4856
Ten years of experience from interactive ergonomics projects <i>J. Eklund and J. Karlton</i>	4862

S46 Transport Ergonomics and Human Factors 4

- Decision support for vessel traffic service (VTS): user needs for dynamic risk management in the VTS
Gesa Praetorius and Margareta Lützhöft 4866
- Transmitting intended and suggested routes in ship operations: cognitive off-loading by placing knowledge in the world
Thomas Porathe 4873
- New insights, new challenges; person centred transport design
Andree Woodcock 4879
- From the “terrain” to “territory”: which contributions from mobility and bus drivers’ activity towards local development?
Liliana Cunha and Marianne Lacomblez 4887
- Ergonomic investigation on pedestrian crossing with traffic light signalization
Giuseppe Amado and Anamaria de Moraes 4893
- What does a motorcyclist look at while driving at urban arterials?
Dimitris Nathanael, Evangelia Portouli, Kostas Gkikas and Vassilis Papakostopoulos 4900

S47 Transport Ergonomics and Human Factors 5

- Skills of novices early trained or traditionally trained versus experienced drivers confronted to simulated urban accidents’ scenarios
Catherine Berthelon and Loïc Damm 4907
- Factors and motives of unsafe behaviors of road users
H. Boudrifa, A. Bouhafis, M. Touill and F. Tabtroukia 4910
- Assessment of cognitive workload of in-vehicle systems using a visual peripheral and tactile detection task setting
Klaus Bengler, Martin Kohlmann and Christian Lange 4919
- Ergonomic evaluation of a wheelchair transportation securement system
Madiha Ahmed, Naira Campbell-Kyureghyan, Karen Frost and Gina Bertocci 4924

S48 Transport Ergonomics and Human Factors 6

- Aircraft accident investigation: the decision-making in initial action scenario
Marcia M. Barreto and Selma L.O. Ribeiro 4931
- Aircraft seating comfort: the influence of seat pitch on passengers' well-being
Florian Kremser, Fabian Guenzkofer, Claudia Sedlmeier, Olaf Sabbah and Klaus Bengler 4936
- Research of injuries of passengers in city buses as a consequence of non-collision effects
Aleksandar Zunjic, Vladimir Sremcevic, Vera Zeravcic Sijacki and Ana Sijacki 4943
- Low-floor bus design preferences of walking aid users during simulated boarding and alighting
Clive D'Souza, Victor Paquet, James Lenker, Edward Steinfeld and Piyush Bareria 4951

S49 Risk Assessment and Interventions in Agriculture

- Ergonomic factors and production target evaluation in eucalyptus timber harvesting operations in mountainous terrains
Amaury Paulo de Souza, Luciano José Minette, André Luis Petean Sanches and D.S. Emilia Pio da Silva 4957
- Protective gloves on manual sugar cane cutting are really effective?
R.F. Abrahão, M.C. Gonzaga and O.A. Braunbeck 4963
- Impacts of introducing a new tool for the manual harvesting of sugar cane: the ergonomic analysis contribution
C.D.R. Souza, A.B.G.J. Filho and R.A.V. Silva 4967
- A randomized intervention trial to reduce mechanical exposures in the Colombian flower industry
L.H. Barrero, C. Ceballos, R. Ellegast, J.A. Pulido, M. Monroy, S. Berrío and L.A. Quintana 4971
- Work and technological innovation in organic agriculture
M.J.A. Tereso, R.F. Abrahão, S.F.B. Gemma, U.B. Montedo, N.L. Menegon, J.E. Guarneti and I.A.V. Ribeiro 4975

S50 Health Hazards in Agriculture

- Thermal comfort and personal protective equipment (PPE)
*Ronaldo André Castelo dos S. de Almeida, Marcelo Motta Veiga,
 Francisco José de Castro Moura Duarte, Luiz Antônio Meirelles
 and Lilian Bechara Elabras Veiga* 4979
- Occupational Health Hazards & Efficacy of Protective Masks in
 Threshing Operation
Sudesh Gandhi, M. Dilbaghi, M. Mehta and Neelam Pruthi 4983
- Family farming workers mental health in a microrregion in southern Brazil
Ângela Regina Poletto and Leila Amaral Gontijo 4987
- Pesticide exposure and sprayer's task goals: comparison between
 vineyards and greenhouses
Mandy Lambert, James Richardson and Sonia Grimbuhler 4995

S51 Innovation and Intervention Evaluation in Agriculture

- Intervention of drudgery reducing technologies in agriculture and
 impact evaluation
Manju mehta, Sudesh gandhi and Mamta dilbaghi 5003
- Innovation - decision behaviour of tribal women of udaipur district
 regarding vermiculture technology
Latika Vyas 5009
- Usability study of a vineyard teleoperated compost spreader
Ester Ferrari and Eugenio Cavallo 5019
- An ergonomics approach to citrus harvest mechanization
Simone Emmanuelle Alves Costa and João Alberto Camarotto 5027

S52 Last 30 years of the IEA

- The recent history of the IEA: an analysis of IEA Congress presentations
 since 1961
Patrick Waterson, Pierre Falzon and Flore Barcellini 5033
- Emerging role of human factors and ergonomics in healthcare
 delivery – A new field of application and influence for the IEA
Pascale Carayon 5037

Recurring issues in the IEA, the discipline and the profession of ergonomics/human Factors <i>John R. Wilson</i>	5041
S53 The new challenges of future vehicle HMI design, towards safer and positive experience	
Using naturalistic driving films as a design tool for investigating driver requirements in HMI design for ADAS <i>Minjuan Wang, Dong Sun and Fang Chen</i>	5045
Methodical aspects of text testing in a driving simulator <i>A. Sundin, C.J.D. Patten, M. Bergmark, A. Hedberg, I.-M. Iraeus and I. Pettersson</i>	5053
The use of affective interaction design in car user interfaces <i>Dimitrios Gkouskos and Fang Chen</i>	5057
Countermeasure drowsiness by design – using common behaviour <i>Staffan Davidsson</i>	5062
Towards a model to interpret driver behaviour in terms of mismatch between real world complexity and invested effort <i>Robert Broström and Staffan Davidsson</i>	5068
S54 New world of work and its effects on comfort, health and productivity	
New ways of working: does flexibility in time and location of work change work behavior and affect business outcomes? <i>Merle M. Blok, Liesbeth Groenesteijn, Roos Schelvis and Peter Vink</i>	5075
The effects of new ways of work in the Netherlands: national data and a case study <i>P. Vink, M. Blok, M. Formanoy, E. de Korte and L. Groenesteijn</i>	5081
Examining new ways of office work between the Netherlands and the USA <i>M. Robertson and P. Vink</i>	5086
30 Years of Ergonomics at 3M: A Case Study <i>N. Larson and H. Wick</i>	5091

Expectation Changes and Team Characteristics in a Participatory Design Process <i>Conne Mara Bazley, Annelise De Jong and Peter Vink</i>	5099
Participatory ergonomics and new work: reducing neck complaints in assembling <i>S.A. Miguez, M.S. Hallbeck and P. Vink</i>	5108
S55 Design and Evaluation of Work Systems for Aging Employees	
Influences of mechanical exposure biographies on physical capabilities of workers from automotive industry – a study on possible dose-response relationships and consequences for short and long term job rotation <i>Holger Rademacher, Ralph Bruder, Andrea Sinn-Behrendt and Kurt Landau</i>	5114
Impact of increasing productivity on work content and psychosocial work characteristics in Chaku-Chaku assembly lines - a follow-up study in a German automotive manufacturing company <i>José-Alonso Enriquez-Díaz, Daniel Kotzab, Alina Sytch and Ekkehart Frieling</i>	5121
Consolidated findings from 6 years research on the age-differentiated design of humancomputer interaction <i>Sebastian Vetter, Jennifer Bützler, Nicole Jochems and Christopher M. Schlick</i>	5129
Promoting work ability and well-being in hospital nursing: The interplay of age, job control, and successful ageing strategies <i>Andreas Müller, Matthias Weigl, Barbara Heiden, Jürgen Glaser and Peter Angerer</i>	5137
What makes age diverse teams effective? Results from a six-year research program <i>J. Wegge, F. Jungmann, S. Liebermann, M. Shemla, B.C. Ries, S. Diestel and K.-H. Schmidt</i>	5145
Aging: physical difficulties and safety in cooking tasks <i>N.I. Ibrahim and S. Davies</i>	5152
Field study of age-differentiated strain for assembly line workers in the automotive industry <i>Kerstin Börner, Christian Scherf, Bianca Leitner-Mai and Birgit Spanner-Ulmer</i>	5160

S56 Neuroergonomics, Technology and Cognition

Symposium: Neuroergonomics, technology, and cognition

*Raja Parasuraman, Carryl L. Baldwin, Benjamin Knott,
Joel S. Warm, Victor Finomore, Deborah Boehm-Davis
and Scott M. Galster*

5167

S57 Ergonomics Analysis of Work and Training: Part 1 – Transmission and construction of knowledge in work situations

The influence of flexible management practices on the sharing of
experiential knowledge in the workplace: a case study of food service
helpers

Elise Ledoux, Esther Cloutier and Pierre-Sébastien Fournier

5172

Specialisation and training for fire-fighters driving heavy rescue vehicles:
consequences for the development of operators?

Christine Vidal-Gomel, Catherine Delgoulet and Déborah Gébaï

5177

Coordination meetings as a means of fostering collective learning among
jury members involved in the validation of prior learning (VPL)

Cortessis Sandrine

5184

Active participation in preventionist professional practices: a specific
ergonomics training course

*Léonard Querelle, Michel Duwelz, Joffrey Beaujouan and
Anne Pignault*

5189

Landscaping: teamwork and integration into inter-individual coordination
as a learning situation

Patrick Mayen and Paul Olry

5196

S58 Ergonomics Analysis of Work and Training: Part 2 – Analysis of trainers' and teachers' activities and their pedagogical views (or the consequences thereof)

Being a trainer in the French vocational training system: a case study of
job status and working conditions in relation to perceived health

Catherine Delgoulet

5203

Conditions, demands and constraints on trainers' activity: a case study in
the Portuguese context

Marta Santos and Andreia Ferreira

5210

"Obey", "disobey" or "tinker with" reforms to the system: a subject for French teacher trade unions to work on <i>Dominique Cau-Bareille</i>	5218
Physical education and sport teachers' health: from expressed ill-being to hindrances of action <i>Fabien Coutarel and Jacques Fiard</i>	5228
What is learned during the first moments of work? <i>Claire Tourmen, Annie Leroux and Sylvie Beney</i>	5231
S59 Prospective ergonomics 1: approaches and principles	
Prospective ergonomics: origin, goal, and prospects <i>Jean-Marc Robert and Éric Brangier</i>	5235
Innovation and design approaches within prospective ergonomics <i>André Liem and Eric Brangier</i>	5243
Cognitive Chrono-Ethnography (CCE): a methodology for anticipating future user needs <i>Muneo Kitajima</i>	5251
Ethical issues raised by the new orientations in ergonomics and living labs <i>Javier Barcenilla and Charles Tijus</i>	5259
Measuring a product's usefulness <i>Francois Aubin, Hasmik Atoyán, Jean-Marc Robert and Tigran Atoyán</i>	5266
S60 Prospective ergonomics 1: methods and cases studies	
Anticipating needs and designing new items rapidly – a case study for the design of postural aid equipment <i>Marie-Claude Prévost and Daniel Spooner</i>	5274
Drivers' safety needs, behavioural adaptations and acceptance of new driving support systems <i>Farida Saad and Pierre Van Elslande</i>	5282
Activity analysis: contributions to the innovation of projects for aircrafts cabins <i>N.T. Rossi, F.M. Gregghi, L.N. Menegon and G.B.J. Souza</i>	5288

Designing future products: what difficulties do designers encounter and how can their creative process be supported? <i>Nathalie Bonnardel</i>	5296
S61 Agricultural Health and Safety and Ergonomics in Sweden	
Health and safety strategy in Swedish agriculture <i>Peter Lundqvist and Catharina Alwall Svennefelt</i>	5304
The farrier's work environment <i>Lotta Löfqvist and Stefan Pinzke</i>	5308
What factors attract and motivate dairy farm employees in their daily work? <i>Christina Lunner Kolstrup</i>	5311
Tractor accidents in Swedish traffic <i>Stefan Pinzke, Kerstin Nilsson and Peter Lundqvist</i>	5317
Occupational Accidents Among Elderly Farmers in Sweden <i>Kerstin Nilsson and Stefan Pinzke</i>	5324
S62 Musculoskeletal Disorders in Agriculture	
Social partners cooperation for reduction of musculoskeletal disorders in agriculture <i>Veerle Hermans, David O'Neill, Roeland Motmans, Peter Lundqvist and Danuta Roman-Liu</i>	5327
Relationship between productivity, quality and musculoskeletal disorder risk among deboning workers in a Chilean salmon industry <i>Juan S. Ilardi</i>	5334
Ergonomics and design in the Brazilian agricultural sector: a proposal to build matrix of contradictions <i>Thaís Tosetto and João Alberto Camarotto</i>	5339
Ergonomic analysis in the bagging of gran equipment: unsuitability of the work stations <i>Suzi Mariño and Leandro Lemos</i>	5347
Workload composition of the organic horticulture <i>R.F. Abrahão, I.A.V. Ribeiro and M.J.A. Tereso</i>	5355

S63 How assess an Employee with Work Related Musculoskeletal Disorder?

Assessment of psychosocial risk factors <i>Deepak Sharan</i>	5361
Physical examination, special tests and investigations for the diagnosis of WRMSD <i>Deepak Sharan</i>	5363
Ergonomic workplace analysis (EWA) <i>Deepak Sharan</i>	5366
History taking <i>Jerrish A. Jose</i>	5369

Poster Sessions**Area: Aerospace Human Factors and Ergonomics**

The passing of the shift in aircraft maintenance - a task that produces deaths <i>Reginaldo Campos, Edgard Martins and Marcelo M. Soares</i>	5371
---	------

Area: Aging

Influences of tactile-dot height and tip radius of curvature on the operational performance of cellular phones <i>Wataru Toyoda, Kouki Doi and Hiroshi Fujimoto</i>	5375
Influences of the edge radius of curvature of tactile dots and bars on their Discriminability <i>Wataru Toyoda, Kouki Doi and Hiroshi Fujimoto</i>	5378
A literature review of major perceptual, cognitive, and/or physical test batteries for older drivers <i>Marc D. Gentzler and Janan A. Smither</i>	5381
Examining the impact of age and multitasking on motorcycle conspicuity <i>Jonathan L. Ledbetter, Michael W. Boyce, Drea K. Fekety, Ben Sawyer, and Janan A. Smither</i>	5384
Movement-in-depth, cognitive impairment, and crash risk <i>Janan Al-Awar Smither, Marc C. Gentzler and Robert S. Kennedy</i>	5386

Area: Agriculture

- Study of postures in sugarcane cutters in the Pontal of Paranapanema-SP, Brazil
Iracimara de Anchieta Messias and Emico Okuno 5389
- Postural analysis of workers in a typical meat processing company in Brazil
Wemerton Luis Evangelista, Ilda de Fátima Tinoco, Amaury Paulo de Souza, Luciano José Minette, Fernando da Costa Baeta, Emilia Pio da Silva and Luciana Aparecida de Oliveira 5392
- The ergonomics analysis of work: a case study in a experimental farm
Maria de Lourdes Santiago Luz and Syntia Lemos 5395
- Pesticide exposure and sprayer design: ergonomics evaluation to reduce pesticide exposure
Sonia Grimbuhler, Mandy Lambert, Julien Nelson and James Richardson 5398

Area: Anthropometry

- On the road toward the development of clothing size standards and safety devices for Chilean workers
Esteban Oñate, Felipe Meyer and Jorge Espinoza 5400
- Metrology and ergonomic mensuration parameters
C. Cardoso and L. Drucker 5403
- A study of automotive workers anthropometric physical characteristics from Mexico Northwest
Karla Lucero-Duarte, Enrique de la Vega-Bustillos and Francisco López-Millán 5405
- Anthropometric data of adult wheelchair users for Mexican population
Karla Lucero-Duarte, Enrique de la Vega-Bustillos, Francisco López-Millán and Selene Soto-Félix 5408
- Analysis of the suitability of furniture university – anthropometric characteristics of user
Amanda S. Castilho, Camila de Cássia A. Leme and Rosimeire S. Padula 5411

A practical approach to the assesment of manual handling equipment for cargo: multinational abrasives in Brazil <i>João Barbosa Neto, Eduardo Aparecido Centeio, Fernando de Sampaio Siqueira and Rosimeire Simprini Padula</i>	5413
Anthropometry of Algerian elderly <i>L. Bouabdallah</i>	5415
Area: Auditory Ergonomics	
A study on the influence of headphones in auditory perceptual function <i>Yoshinori Horie and Takashi Torizuka</i>	5417
Effects of placement point of background music on shopping website <i>Chien-Jung Lai and Chia-Chi Chiang</i>	5419
Area: Building and Construction	
Critical analysis about solutions and models of solar shades in non-residential buildings from tropical regions <i>J.A.B. Castañon, L.F.D. Caldeira, M.F. Gervásio and F.M. Brum</i>	5422
Mass of materials: the impact of designers on construction ergonomics <i>John Smallwood</i>	5425
Abandonment and accessibility in railway historical buildings: Central do Brasil and Leopoldina Railstation <i>C.C.G. Brasil, A.M. Costa and J.A.B. Castañon</i>	5431
The question of the ergonomic use of virtual models <i>J.A.B. Castañon, T.S. Saraiva and T.T. Araujo</i>	5434
Area: Ergonomics Analysis of Work and Training	
Differences in cashiers work technique regarding wrist movements when scanning groceries <i>Palm Peter, Johansson Elin, Kjellberg Katarina and Josephson Malin</i>	5436
Ergonomics analyses of five joineries located in Florianópolis-SC, using the LEST Method <i>Lizandra Lupi Garcia Vergara, Carolina Schwinden Garcia and Felipe Vergara Miranda</i>	5439

Experimental indicators of ergonomic wellness and quality of life: salivary and hair cortisol <i>P.L. Esposito, A. Comin, T. Peric, M. Montillo, M. Mascolo, G. Tubaro and A. Prandi</i>	5442
Increased of Brazilian productivity in the slaughterhouse sector: a review <i>Márcia Rosângela Buzanello and Antônio Renato Pereira Moro</i>	5446
The ergonomic process of an automotive company in Brazil: a study case <i>Carolina Bustos, Daniela Fischer, Lucimara Ballardin and Rudolf Nielsen</i>	5449
Ergonomic risks in mining companies: a study in Paraíba/Brazil <i>S.F.A. Morais, A.C.Q. Santos, W.P. Gonçalves, H.C. Albuquerque Neto and E.J. Sanjinéz Argandoña</i>	5453
The challenges of interdisciplinary education and its application on teaching ergonomics <i>Leticia Holtz Barbosa and Maria Helena Câmara Pinheiro</i>	5456
Job satisfaction among control room operators of electrical systems <i>Amanda A. Silva Macaia, Elaine C. Marqueze, Lúcia Rotenberg, Frida Marina Fischer and Claudia R.C. Moreno</i>	5459
Analysis of the ergonomic usage of the ARMflex® in the odontological area <i>Cynthia Casagrande Matos, Alda Milagres de Assis, Lucas Viana Quites and Daniela Casagrande Matos</i>	5462
The structuring of an Ergonomics Program as a Center of Occupational Health Component in a public health institution <i>Suzana S.M. Lugão, Simone L.S.I. Ricart, Renata M.S. Pinheiro and Waldney M. Gonçalves</i>	5465
Analysis of working conditions focusing on biological risk: firefighters in Campo Grande, MS, Brazil <i>Luciana Contrera-Moreno, Sonia Maria Oliveira de Andrade, Ana Rita Coimbra Motta-Castro, Alexandra Maria Almeida Carvalho Pinto, Frederico Reis Pouso Salas and Alcione Cavalheiros Faro Stief</i>	5468
Ergonomic analysis of the work conditions of porters and owners of the Supply Center of Campinas, SP <i>Tatiana Giovanelli Vedovato, Maria Inês Monteiro and Valéria Aparecida Masson</i>	5471

Validity of heart-rate based measurements of oxygen consumption during work with light and moderate physical activity <i>Eva Bernmark, Mikael Forsman, Gunilla Pernold and Christina Wiktorin</i>	5475
Regulation in work and decision-making in the activity of public prosecutors in Santa Catarina, Brazil <i>Beatriz Marcondes de Azevedo and Roberto Moraes Cruz</i>	5477
Finding the team for Mars: a psychological and human factors analysis of a Mars Desert Research Station crew <i>Benjamin D. Sawyer, P.A. Hancock, John Deaton and Peter Suedfeld</i>	5481
Wood, management and dust: analysis of the Context of Production of Goods and Services (CPGS) of an academic woodwork <i>Isabella von Mühlen Brandalise, Paula Macedo César and Clara Cristina de Souza Régo</i>	5485
Maximum force levels in different positions of shoulder and elbow <i>C. Castro, E. De la Vega, G. Báez and F. Carrasco</i>	5488
Development of the workflow kine systems for support on KAIZEN <i>Yuki Mizuno, Toshihiko Ito, Toru Yoshikawa, Satoshi Yomogida, Koji Morio and Kazuhiro Sakai</i>	5491
Ergonomics and the inclusion of disabled people in the Brazilian job market <i>L.B. Martins and A.K.P.S. Cabral</i>	5493
Ergonomic intervention methods for inclusion of people with disabilities at work: Brazilian scene <i>A.K.P.S. Cabral and L.B. Martins</i>	5500
New guidelines for health care for alcohol and drug users and the real work: possible contributions of ergonomics to the restructuring of work and competence development <i>Daniela Tonizza de Almeida and e Eliza Helena de Oliveira Echternacht</i>	5505
Support system for management of shares ergonomic <i>Raphael Pacheco da Rocha and Mario Cesar Rodriguez Vidal</i>	5508

Ergonomic evaluation of the preparation of cuttings and minicuttings for eucalyptus seedling production, with the use of scissors <i>Eduarda Gabriela Santos Cunha, Amaury Paulo de Souza and Luciano José Minette</i>	5511
Slope effect on pushing forces <i>E. Turpin-Legendre and J.P. Meyer</i>	5516
Statistical precision of categorical PATH observations of trunk posture <i>Jennie Jackson, Laura Punnett and Svend Erik Mathiassen</i>	5519
Analysis of the workload of bank tellers of a Brazilian public institution <i>Simoni S. Serikawa, Ana Carolina S. Albieri, Gustavo P. Bonugli and Marina F. Gregghi</i>	5522
Body postures versus production requirements - the case of a fiberglass parts factory <i>V. Silva, B. Pereira, R. Maria and T. Chagas</i>	5525
A novel wearable measurement system for ambulatory assessment of joint loading in the occupational setting <i>Gert Faber, Chien-Chi Chang, Idsart Kingma and Jack T. Dennerlein</i>	5527
Using practical ergonomic evaluations in the restaurant industry to enhance safety and comfort: a case study <i>Marc D. Gentzler and Janan A. Smither</i>	5529
Ergonomic assessment of porridge roaming sale system <i>J. Braga, V. Cardoso, A. Abreu, L. Didoné, M. Evangelista and F. Serra</i>	5532
Effects of a labor gym program in mental workload of workers from rectory of UNIOESTE <i>Isabele Maia Galvão, José Mohamud Vilagra, Helenara Salvati Bertolossi Moreira, Antônio Renato Pereira Moro, Roberto Moraes Cruz, Pedro Ferreira Reis and Mauricio Bertolossi Moreira</i>	5536

Area: Ergonomics for Children and Educational Environments

Analysis on the relationship between the school furniture and the work surface lighting and the body posture of public Middle School students from João Pessoa, Paraíba, Brazil

*Luiz Bueno da Silva, Eliza Juliana da Costa Eulálio,
Antonio Souto Coutinho and Elaine Victor* 5540

Ergonomic considerations in school environments - the need for widening the scope

Kapila Jayaratne 5543

Ergonomic adequacy of the baby nursery of child development center located in UFSC - Florianópolis

Lizandra Garcia Lupi Vergara and Lucie Elisa Ribet 5547

Sleep patterns and sleepiness of working college students

*Liliane Teixeira, Arne Lowden, Andrea Aparecida da Luz,
Samantha Lemos Turte, Daniel Valente, Roberto Jun Matsumura,
Leticia Pickersgill de Paula, Meire Yuri Takara,
Roberta Nagai-Manelli and Frida Marina Fischer* 5550

Global healthy backpack initiatives

Kapila Jayaratne, Karen Jacobs and Dulitha Fernando 5553

Area: Ergonomics in Design

Manual bamboo cutting tool

*Mariana Pereira Bezerra, Walter Franklin Marques Correia
and Fabio Ferreira da Costa Campos* 5558

The correlation between thermal comfort in buildings and fashion products

Aline Giesel and Patrícia de Mello Souza 5561

The importance of ergonomics in the design conceptual process:

Daciano da Costa – A case study on practicing and teaching

Ana Moreira da Silva 5564

The incubator hospital from the viewpoint of ergonomic

*Sthephany Martins de A. Souza and
Vânia Maria Batalha Cardoso* 5567

Usability of car stereo

Bruno Montanari Razza and Luis Carlos Paschoarelli 5570

The suitability of the design of handbags to the tropical climate <i>Camila Osugi Cavalcanti de Alencar and Jorge Boueri</i>	5573
Seniors and technology, ergonomic needs and design considerations <i>Claudia Isabel Rojas Rodríguez</i>	5576
Inclusive design in the implementation of projects for schools modernization in Portugal - case studies <i>Ligia Lopes, Carlos Aguiar and Fernando Moreira da Silva</i>	5579
User-Centered Design (UCD) applied to the identification and modification of unsustainable practices <i>Mercado Colin Lucila and Rodea Chávez Alejandro</i>	5583
Perceptual aspects of the use of faucets (taps) <i>Livia F. de A. Campos and Luis Carlos Paschoarelli</i>	5586
Colour, vision and ergonomics <i>Cristina Pinheiro and Fernando Moreira da Silva</i>	5590
A proposal for an ergonomic redesign for a mixer Mondial B-02 <i>Adilson J. Silva Junior and Bruno Barros</i>	5594
Cognitive ergonomics and production information systems under the gaze of interdisciplinary design or industrial design <i>Luciene Bulhões Mattos</i>	5600
Postmen activity's analysis <i>Fabiola Reinert and Cristina Lucio</i>	5603
Analysis of ergonomic furniture made of wood and sub-products from renewable forests <i>Luciana Aparecida de Oliveira, Amaury Paulo de Souza, Patricia Bhering Fialho, Luciano José Minette and Fernanda Freitas Costa de Torres</i>	5605
Design considerations to improve cognitive ergonomic issues of unmanned vehicle interfaces utilizing video game controllers <i>P. Oppold, M. Rupp, M. Mouloua, P.A. Hancock and J. Martin</i>	5609

Area: Ergonomics in Manufacturing

- Macroergonomic intervention for work design improvement and raw materials waste reduction in a small footwear components company in Rio Grande do Sul-Brazil
Renata Cornelli and Lia Buarque de Macedo Guimarães 5612
- Study about upper limb on highly repetitive work in maquila operations
Lopez-Millan Francisco, Enrique De la Vega, Manuel Rodriguez and Armando Ayala 5621
- Preponderance and possible factors associated to musculoskeletal symptoms in metals industry workers
Eunice Tokars, Antonio Renato Pereira Moro and Gabriel Grabner dos Santos 5624
- The ergonomics approach for thin film transistor-liquid crystal display manufacturing process
Chih-Wei Lu, Chia-Chun Yao and Chein-Wen Kuo 5627

Area: Healthcare Ergonomics

- Interface of drug use
N.O. Ludescher, R.R. Vergilio, C.C. Lucio and J.E.G. Santos 5631
- The effect of visualization method on the performance of simulated microsurgery tasks
Denny Yu, Michael E. Sackllah, Charles B. Woolley, Steven J. Kasten, Daniel Kim, Cooper Green and Thomas J. Armstrong 5634
- Static load in the nursing profession; the silent killer?
J.J. Knibbe and N.E. Knibbe 5637
- An international validation study of the care thermometer: a tool supporting the quality of ergonomic policies in health care
J.J. Knibbe and N.E. Knibbe 5639
- Flying through the hospital: efficiency and safety of an ergonomic solution
J.J. Knibbe, N.E. Knibbe and E. Waaijer 5642
- Ergonomics in the operating room
Jenny Gremark Simonsen, Inger Arvidsson and Catarina Nordander 5644

- Evaluation of the health risks to garment workers in the city of Xambrê-PR, Brazil
Marco Antônio Sant'Ana and Fabricio Kovalechen 5647
- Designing the care environment in hospitals and nursing homes: a pilot for a new and reliable method for determining the optimum space to live in and work in
J.J. Knibbe and E. Waaijer 5650
- The influence of an abdominal support for a dental stool in the distributions and electrical activity of the longissimus and the superior trapezius muscle in dentists
R.A.R. Custódio, J.G.T. Brandão and J.B.O. Amorim 5652
- Assessments of patients with a 5-category or a 3-category practical classification system: validity and practicality
J.J. Knibbe, N.E. Knibbe and E. Waaijer 5655
- The businesscase for ergonomic changes in health care: calculating and predicting financial outcome for ergonomic changes and innovations in health care: interactive businesscase modelling
J.J. Knibbe and N.E. Knibbe 5657
- Study on workloads of human care worker with the introduction of IT system – the characteristics of work loads by observational research and the suggestions for KAIZEN
Yuki Mizuno, Toru Yoshikawa, Fumiko Matsuda, Yuriko Takeuchi, Nobuyuki Motegi, Thor Ikegami and Kazuhiro Sakai 5659
- Experimental study of assistant aids and new nursing method in nursing care work
Nobuyuki Motegi, Fumiko Matsuda, Yuriko Takeuchi and Tetsuo Misawa 5662
- Human factors methods to reduce medication error: using task analysis in a pediatric and adult pharmacy
Nicole E. Werner, Erik T. Nelson and Deborah A. Boehm-Davis 5665
- The ambivalence of the work of the hotel managers: an approach to ergonomics
Cynthia Maria de Gois Leite and Ricardo José Matos de Carvalho 5668

Area: Human Factors and Sustainable Development

- Emotions and leadership. Reasons and impact of emotions in organizational context
Meike Siebert-Adzic 5671
- Harassment at work? Empowerment and autonomy as coping strategies of young workers
Samantha Lemos Turte, Maria Eduarda Cavadinha Correa, Andrea Aparecida da Luz and Frida Marina Fischer 5674
- The relationship between heart rate as an indicator of work hardness and results of dynamometry
Nasrin Sadeghi, Hamidreza Tolide-ie and Fatemeh Ghaderi 5677
- The municipal solid waste and the quality of life of collectors of recyclable materials in Juiz de Fora, Minas Gerais
Aline de Barros Pimenta, Sueli Maria dos Reis Santos, Maria Cristina Pinto de Jesus, Marcos Mantins Borges, Geraldo Luciano de Oliveira Marques and José Gustavo Francis Abdalla 5681

Area: Human Simulation and Virtual Environments

- Cognitive-ergonomics and instructional aspects of e-learning courses
Martha Rodrigues, Iana Castello Branco, José Shimioshi, Evaldo Rodrigues, Simone Monteiro and Marcelo Quirino 5684
- The ambient intelligence for the sake of accessibility in residential projects: a proper study to the Brazilian scene
J.A.B. Castañonm, M.P.F. Maia and M.C.C. Silva 5686
- Proposal of digital interface for the system of the air conditioner's remote control: analysis of the system of feedback
Raisa da Silva de Queiroz Pierre, Tarô Arthur Tavares Kawada and André Guimarães Fontes 5689

Area: Musculoskeletal Disorders

- The effects of exercise reminder software program on office workers' perceived pain level, work performance and quality of life
A. Irmak, G. Bumin and R. Irmak 5692

Effect of finger interaction on individual finger: index finger <i>Yong-Ku Kong, Min-Tae Seo, Hyun-Sung Kang and Dae-Min Kim</i>	5696
Psychosocial indicators among aircraft maintenance workers with and without neck and shoulder musculoskeletal symptoms <i>A. Oliveira, H. Nogueira, A. Diniz and D. Barbieri</i>	5699
Risk factors, clinical features and outcome of treatment of work related musculoskeletal disorders in on-site clinics among IT companies in India <i>Deepak Sharan, P.S. Ajeesh, R. Rameshkumar and Jeena Jose</i>	5702
Ergonomic recommendations when texting on mobile phones <i>Ewa Gustafsson</i>	5705
Applying a time-limit model of movement frequency to field data: is it possible? <i>Emmanuelle Turpin-Legendre and Jean-Pierre Meyer</i>	5707
Prevalence of cervicobrachial discomforts in elementary school teachers <i>Bruna Angela Antonelli, Antonio Augusto de Paula Xavier, Paulina Oenning, Michel Henrique Baumer, Tarcísio Fulgêncio Alves da Silva and Luiz Alberto Pilatti</i>	5709
Prevalence of discomfort/pain complaints and related factors in dental professionals of the public health service in Araucária, Paraná state, Brazil <i>Rosimeire Sedrez Bitencourt and Maria Isabel Ricardo</i>	5715
Exposure assessment in different occupational groups at a hospital using Quick Exposure Check (QEC) – A pilot study <i>Pernilla Ericsson, Martin Björklund and Jens Wahlström</i>	5718
Musculoskeletal symptoms and work ability among agricultural machinery operators <i>Daniela Milani and Maria Silvia Monteiro</i>	5721
Musculoskeletal symptoms in workers of a Telecom Company <i>Evelise Dias Antunes, Célia Regina Alves de Araújo and Zilda Abage</i>	5725

Musculoskeletal symptoms and workers' perception about job factors in a pulp and paper industry <i>Marina Zambon Orpinelli Coluci, Neusa Maria Costa Alexandre and Thais de Freitas Pedrini</i>	5728
Physical variation in low-load work – physiological effects during exposure & recovery <i>Marcus Yung and Richard Wells</i>	5731
Raising awareness of psychosocial factors in the occurrence of low back symptoms in developing countries <i>Baiduri Widanarko, Stephen Legg, Jason Devereux and Mark Stevenson</i>	5734
Low back injuries related to nursing professionals working conditions: a systematic review <i>Roberta Schlossmacher and Fernando Gonçalves Amaral</i>	5737
Cardiovascular and subjective strain during upper limb endurance tests <i>E. Turpin-Legendre and J.P. Meyer</i>	5739
Field data for "acceptable" frequency of repetitive task: data to support standardization work <i>Emmanuelle Turpin-Legendre and Jean-Pierre Meyer</i>	5741
Stress and musculoskeletal discomfort among hydrocarbon industry workers in Mexico <i>R. Avila-Chaurand, L.R. Prado-León and E.L. González-Muñoz</i>	5743
Analysis of the compensatory postures adopted by day caregivers through OWASOvako Working Posture Analysing System <i>Helenara Salvati Bertolossi Moreira, Mauricio Bertolossi Moreira, José Mohamud Vilagra, Isabele Maia Galvão, Abel Santos de Oliveira and Andrea Cristina de Lima</i>	5746
The physical workload analysis method : application of ergonomics standards for companies of any size <i>J.-P. Zana, J.-P. Meyer and E. Turpin-Legendre</i>	5749
Area: Organizational Design and Management	
Ergonomic and organizational analysis of an association of collectors of recyclable waste <i>R. Maria, T. Chagas and V. Silva</i>	5752

Consequences of organizational commitment in abolished company sports team - A case study in Japan- <i>Yuki Honda, Yasuyuki Hochi and Motoki Mizuno</i>	5754
A study on the relationship between commitment of club activity and vocational readiness among university students <i>Takashi Mizusawa, Yasuyuki Hochi and Motoki Mizuno</i>	5756
Relationship between collective efficacy and contextual performance among university athletes in Japan <i>Yasuyuki HochiI, Motoki Mizuno and Takahiro Nakayama</i>	5759
A longitudinal study on the effects of team building for university baseball team in Japan: From the view point of team-vitalization <i>Yasuyuki Hoch, Motoki Mizuno, Takahiro Nakayama and Kaoru Kitamura</i>	5762
Relationship between state anxiety and success rate in game performance, coach's evaluation among Japanese university volleyball players <i>Kai Yamada, Yujiro Kawata, Nobuyuki Nakajima and Masataka Hirosawa</i>	5764
Construction of the integrated model for practical career support to the professional athletes <i>Motoki Mizuno, Yasuyuki Hochi, Mami Inoue, Ikuyo Kaneko and Yasuyuki Yamada</i>	5767
Using Balanced Scorecard (BSC) approach to improve ergonomics programs <i>Marcelo Vicente Forestieri Fernandes</i>	5769
Proposal for an integrative methodology to development the ergonomic program <i>Lopez-Millan Francisco, De la Vega Enrique, Lucero Duarte Karla and Diaz Muro Martha</i>	5772
Ports modernization and its influence on trade unions <i>Regina Heloisa Maciel, Taise Araújo Lopes and Rosemary Cavalcante Gonçalves</i>	5775
The relationship between perceived quality and divulgation strategies of products in the electronic marketplace <i>João Costa and Milton Horn</i>	5778

Cognitive and organizational ergonomics in the transition of the new integrated center of control of an oil refinery: human reliability and administration of changes

Lucy M.S. Bau, Magda S.E.S. Puquirre, Sandro A. Buso, Érika L. Ogasawara, Carolina R. Marcon Passero and Marcos C. Bianchi

5781

Area: Psychophysiology in Ergonomics

Mind reading through the eyes: an fMRI study

Yujiro Kawata, Eiji Kirino, Motoki Mizuno and Masataka Hirose

5785

Daily rhythm of salivary IL-1 β , cortisol and melatonin in day and night workers

Érica Lui Reinhardt, Pedro Augusto Carlos Magno Fernandes, Regina Pekelmann Markus and Frida Marina Fischer

5788

Association between repetitive work and occupational cold exposure

Márcia Rosângela Buzanello and Antônio Renato Pereira Moro

5791

An epidemiological profile of cashiers holders carpal tunnel syndrome in a grocery store chain

R. Costa, R. Barros, D. Campos, D. Lima and Geórgi Barbosa

5794

Area: Safety and Health

Economic incentives and the epidemiological indicators can contribute to the reduction of occupational hazards?

Maria Luiza C. Comper and Rosimeire S. Padula

5799

Assessment of quality of sleep and sleepiness in workers with rotating shifts

Rosimeire Simprini Padula and Graciela Junqueira de Abreu

5801

Ergonomic initiatives at Inmetro: measuring occupational health and safety

L. Drucker, M. Amaral, and C. Carvalheira

5803

Quality of diet of working college Students

Bartira Gorgulho, Dirce Maria Lobo Marchioni, Adriana Balian da Conceição, Josiane Steluti, Marina Hurga Mussi, Roberta Nagai-Manelli, Liliane Reis Teixeira, Andréa Aparecida da Luz and Frida Marina Fischer

5806

Ergonomic risks on the operational activities of firefighters from Rio de Janeiro <i>Flávia Curi Vitari, Hilmar Soares Francisco and Márcia Gomide da Silva Mello</i>	5810
The ruler of inclusion in the process of people learning with visual disability <i>Eliane Mafra, Eduardo Concepcion Batiz and Marcelo Macedo</i>	5813
Teachers' sick leave due to mental and behavioral disorders and return to work <i>Amanda Aparecida Silva and Frida Marina Fischer</i>	5815
Work of gravediggers and health <i>Fernando Pinheiro, Frida Marina Fischer and Claudio José Cobianchi</i>	5819
Cognitive representation of the comprehension test of safety warnings using multivariate methods <i>M.M. Cardoso and R.A. Scarpel</i>	5823
Changes in human cervical and lumbar spine curves while bicycling with different handlebar heights <i>Yi-Lang Chen and Kuo-Chang He</i>	5826
Identification of the mental workload of public employees in the administrative sector at a public university <i>Andressa Aline Sontag, José Mohamud Vilagra, Helenara Salvati Bertolossi Moreira, Antônio Renato Pereira Moro, Roberto Moraes Cruz, Pedro Ferreira Reis and Isabele Maia Galvão</i>	5828
What is safety culture and risk-taking like at a large steel manufacturing company? <i>Hasse Nordlöf</i>	5831
Attention deficit/hyperactivity disorder's effects on individuals' scan paths during a simulated drive <i>J.R. Michaelis, D.S. McConnell and J.A. Smither</i>	5833
Comparison of five approaches to keeping power line maintainers' hands warm during work in the cold <i>S. Hunt and R. Wells</i>	5836

A method to assess safety and resilience in radiopharmaceuticals production process <i>Cláudio H.S. Grecco, Mario C.R. Vidal, Isaac J.A.L. Santos and Paulo V.R. Carvalho</i>	5839
Screening stress factors survey in an institute of advanced studies: health and safety integrated plans <i>C.S. Fonseca, C.N. Gomes and F.S. Barros</i>	5844
Administrative rationality and coping strategies in shift work <i>Renato Rocha Lieber, Rodrigo Neiva Kvieska and Maurício Cesar Delamaro</i>	5847
Quantitative noise analysis at two marble finishing plants in Olinda, Pernambuco, Brazil <i>Rútilo P. de Melo Neto, Emilia R. Kohlman Rabbani, Béda Barkokébas, Eliane M. G. Lago, and Jonathas B. de A. Freitas</i>	5850
Application of preliminary risk analysis at marble finishing plants in Recife's metropolitan area <i>Rútilo P. de Melo Neto, and Emilia R. Kohlman Rabbani</i>	5853
Pulmonary function and exercise capacity in metal industry workers <i>Mônica V. Gonçalves, Rosane F. Bernardes, Luciana D. Chiavegato and Rosimeire S. Padula</i>	5856
Study of activities of postmen motorcyclists: a look at motorcycle accidents <i>Lícia Maria Barreto do Nascimento and Gracielle Aparecida Orlando Bortolotto</i>	5858
Area: Slips, Trips and Falls	
Use-related risk analysis for medical devices based on improved FMEA <i>Long Liu, Shuai Ma, ZhuWang and Ping Li</i>	5860
Area: Transport	
The profile of cyclists in the city of Juiz de Fora <i>Ugo Castañon, José A.B. Castañon and Marcio P.S. Santos</i>	5866

In-depth analysis of road crashes involving powered two-wheelers vehicles: typical human functional failures and conditions of their production <i>Pierre Van Elslande, Jean-Yves Fournier and Magali Jaffard</i>	5871
Mobility and accessibility in historic cities <i>Ana Carla Carvalho, Rachel Filgueiras Paschoalin and José Alberto Castañon</i>	5874
Distractions N' Driving: video game simulation educates young drivers on the dangers of texting while driving <i>Haneen Saqer, Ewart de Visser, Jonathan Strohl and Raja Parasuraman</i>	5877
Determining skill transferability of action games as a method to reduce in-vehicle phone distractions <i>M. Rupp, McConnell and J.A. Smither</i>	5880
The impact of emotions and predominant emotion regulation technique on driving performance <i>G.M. Hancock, P.A. Hancock and C.M. Janelle</i>	5882
The effects of iPod and text-messaging use on driver distraction: a bio-behavioral analysis <i>M. Mouloua, A. Ahern, A. Quevedo, D. Jaramillo, E. Rinalducci, J. Smither, P. Alberti and C. Brill</i>	5886
Area: Visual Ergonomics	
Use of color lights for the detection of anomalies in quality systems <i>G. Báez, E. De la Vega, C. Castro and R. Elizarraras</i>	5889
Company Case Studies	
CCS01 – Company Case Studies: Introduction & cases from Aviation	
Case studies – ergonomics in projects <i>Ruud N. Pikaar</i>	5892
Airport baggage handling – where do human factors fit in the challenges that airports put on a baggage system? <i>O.N.M. Lenior</i>	5899

Ergonomic work analysis of airbus pilots job in Brazil <i>Tathiana Passeri Monteiro, Diego Cesar Marques, Victor Gonçalves Barbosa and Priscila Uatanabe</i>	5905
CCS02 – Company Case Studies and health organizations	
Transforming a hospital safety and ergonomics program: a four year journey of change <i>Vicki J. Missar, Don Metcalfe and Gail Gilmore</i>	5912
Integration of ergonomics in the prevention policy of a large university hospital <i>Kristien Selis, Hilde Vanacker, Veerle Hermans, Godewina Mylle, Herman Devriese and Kris Kerckhofs</i>	5917
Return on Investment of an On-site Employee Health Clinic in Multinational Information Technology Company in India <i>Deepak Sharan</i>	5921
Design and Implementation of a Novel Tool Addresses the Greatest Cause of Wrist Injuries at Bayer Healthcare <i>Allen Yagjian</i>	5924
CCS03 – Company Case Studies from Industry 1	
Ergonomics, automation and logistics: practical and effective combination of working methods, a case study of a baking company <i>Leonardo Quintana, Claudia Arias, Jorge Cordoba, Magda Moroy, Jean Pulido and Angela Ramirez</i>	5931
Development of an ergonomics device for maintenance of hydraulic generators of Tucuruí hydropower plant <i>I.C. Batista, G.J.C. Gomes, C.S. Teles, P.F. Oliveira, R.M. Santos, A.C. Sassi, B.B.V. Sá and A.A. Pardaul</i>	5935
Design and implementation of ergonomic performance measurement system at a steel plant in India <i>Pradip Kumar Ray and V.K. Tewari</i>	5943
Ergonomic study of an operator's work of a molybdenum plant <i>Esteban Oñate and Felipe Meyer</i>	5950

CCS04 – Company Case Studies from Industry 2

- Ergonomic work analysis of urban bus drivers in Rio de Janeiro city
Aloá Querido, Tainan Nogueira, Rafael Gama and José Orlando 5956
- Biomechanical modelling and evaluation of construction jobs for performance improvement
Ratri Parida and Pradip Kumar Ray 5959
- Eletrobras management program in ergonomics: the pursuit of excellence through maturity levels
Paulo Roberto de Oliveira Bassil Pires and Fagner Fagundes Rezende 5966
- Ergonomic design of crane cabins: a case study from a steel plant in India
Pradip Kumar Ray and V.K. Tewari 5972

CCS05 – Company Case Studies: manufacturing ergonomics and closing session

- 3M Brazil ergonomics: a success story in the making
N. Larson, R. Oshiro and O. Camargo 5977
- Ergonomics and design: its principles applied in the industry
Ademario Santos Tavares and Francisco Nilson da Silva 5981
- A case study of smoke detector assembly work method intervention and evaluation
Chuan Sun, Bryan Buchholz and Jeff Thomas 5987
- Participatory ergonomic intervention for prevention of low back pain: assembly line redesign case
João Marcos Bernardes, Claudia Wanderck and Antônio Renato Pereira Moro 5993

Special Session**SSO3**

- How to use programme theory to evaluate the effectiveness of schemes designed to improve the work environment in small businesses
Kirsten Olsen, Stephen Legg, Peter Hasle 5999

Development of a score for assessing severity, predicting interventions and prognosis of musculoskeletal disorders <i>Deepak Sharan and P.S. Ajeesh</i>	6007
Ergonomic aspects simulation digital online: an educational game proposal to promote environmental education <i>D.F. Arbex, R. Jappur, P. Selig and G. Varvakis</i>	6011
Immune Responses to Low Back Pain Risk Factors <i>Riley E. Splittstoesser, William S. Marras and Thomas M. Best</i>	6016

Ergonomics and sustainability in the design of everyday use products

Francesca Tosi*,
University of Florence, Faculty of Architecture

Abstract. The relationship between Ergonomics and Design is a key element in the sustainability project, as well as in many other areas of experimental design. In the Design for Sustainability field, Ergonomics is a strategic factor for design culture innovation, providing designers with the necessary knowledge and skills regarding human characteristics and capabilities, as well as user needs and desires during use and interaction with products in work activities and everyday life. Ergonomics is also a strategic innovative factor in design development and manufacturing processes. In fact, ergonomics provides a methodological approach in user-product interaction evaluation processes through the use of participatory design and survey methods, user trials, direct observation, savings and resource conservation, etc.

On the other hand, design offers solutions able to interpret user needs and expectations, at the same time suggesting new behaviors and lifestyles.

In Design for Sustainability, the ergonomic and user-centered approach contributes greatly to lifestyles and innovative use of products - making it possible to understand and interpret real people needs and expectations in their everyday actions and behavior.

New consumption patterns, new awareness of lifestyles, energy source consumption, purchasing methods and consumption style etc. can be supported by design innovation, responding to expressed and unexpressed user needs. With this in mind, the ergonomic approach represents the starting point for design choices and at the same time, a tool for assessing their appropriateness and effectiveness.

Keywords: user needs, lifestyle innovation, product innovation

1. Introduction

Ergonomics in Design and Sustainability is one of the most active and innovative components of ergonomic research, and one of the greatest areas of focus in the development of user-involvement based procedures in decision-making and innovation processes.

The development of research lines and areas of experimental design that are transversal to the areas of ergonomics for design and sustainability, springs from a highly innovative approach to the more general theme of the "design for the people" field in which there is a confrontation between research topics and design innovation experiences that frequently tend to find common grounds of exchange and dialogue.

The relationship between Ergonomics and Design is indeed essential in Design for Sustainability, as well as in many other areas of experimental design.

Ergonomics is now an essential component of the design culture, and a key factor for both product and production process innovation, capable of guiding design processes towards the real needs and expectations of individuals and the community.

Ergonomics also provide the necessary methodological contents and an intervention philosophy that allow for building a user-oriented design process and, at the same time, the design offers solutions capable of interpreting user-needs and expectations and suggesting new behaviors and lifestyles. Many of the research and experimentation lines developed in recent years in the field of Ergonomics for

*Corresponding author. E-mail: francesca.tosi@unifi.it

Design and, in parallel, in the field of environmental sustainability, have addressed from both standpoints the issues of sustainability and safety of production processes and the impact that said processes and more generally, the western development model have on the welfare and health of individuals and the community.

While there are many points of contact among the three areas – ergonomics, design, and sustainability - already widely addressed and developed in terms of theoretical and methodological research - the experiments conducted in the field of applied research and experimental design and, in particular, the development of new expressive languages and the creation of innovative design solutions, are instead very recent.

2. Ergonomics for Design and Sustainability: the development of a research and intervention area

Many of the contents that have been forming over recent years in the area of Ergonomics in Design, have much in common with the goals and philosophy of sustainable design.

The growing focus on the "people-centered" aspect can be observed in the various design areas and specializations - from product design and architectural design, to town and territorial planning - which are now turning to issues of sustainability of the production and consumption processes, protection of the environment and non-renewable resources generated by the crisis of the western development model.

One of the main features of ergonomics that has characterized its development from the start, is the ability to continually expand its fields of interest and intervention, embracing ever-new disciplines and skills, in an ongoing expansion and enrichment process in which each component - old and new - neither excludes nor denies the previous ones, considering them instead as parallel specializations with which to define increasingly new grounds for dialogue and shared survey approaches.

It therefore seems natural for ergonomics to encompass issues of environmental sustainability, to which it can offer, albeit with different intervention methods, its methodological approach aimed at assessing and interpreting the modalities and conditions via which it implements "the interaction between individuals and other elements of a system", and a philosophy of action, oriented to respond with innovative design and intervention solutions to the needs and expectations of the individual and the community.

In the field of Design for Sustainability, as in all fields of design, Ergonomics represents an innovation factor of the design culture that provides the designer with the necessary knowledge about human characteristics and capabilities, and the methodological tools for evaluating different people-needs during use and interaction with the products at work and in everyday life. Ergonomics is also a key factor in the development of design and manufacturing processes. Indeed, it provides structured methods designed to evaluate user-product interaction, and to identify and interpret user needs, expectations and desires.

The ergonomic approach can thus represent both the starting point of the design process - deriving from the knowledge of characteristics and capabilities of Human Factors, and from the knowledge of user needs and expectations, from their interpretation based on structured survey and evaluation methods of the User-Centered Design approach - and at the same time, the tool for assessing their appropriateness and effectiveness.

With regard to the role of design in the field of sustainability, as well as in all its fields of intervention, this is based on the ability to imagine and elaborate innovative design solutions and to synthesize them into a finished product, able to interpret the needs, expectations and desires of people, as well as suggesting new behaviors and lifestyles.

Design is by definition based on the ability to synthesize creative synthesis of innovation and technical feasibility, which may have as its starting point technological and/or production innovations, scientific innovations, factors of social change - or it may spring from the ability to give new interpretations to existing technologies, materials, or production processes, as well as the capacity to interpret existing behaviors, habits, languages and knowledge in an innovative key.

Design is also based on the ability to synthesize different types of disciplinary knowledge - traditionally coming from the scientific, technological and humanistic areas - or rather, the ability to synthesize the knowledge, stimuli and contributions coming from different disciplines and different research areas in the project.

The same training model of the designer is based on the contribution and dialogue between different disciplinary components. A training model that does not produce a "know-all" designer, who knows everything about all the various areas of knowledge in his or her training, but rather, a designer able to tackle the differing research and project topics in a

complex key through the ability to communicate with all the different disciplines and professional skills, and through the interpretation and systematization of all the contributions, tools and languages. The design approach, at the same time "innovation maker" and interpreter of traditionally far removed knowledge and skills, moves closer to the ergonomics approach and its action philosophy based on the integration of different knowledge and skills, and on a strictly methodological system, capable of providing information and tools for dialogue and comparisons among the various scientific and professional skills.

Similar to ergonomics, the designer also plays a connecting role among different disciplines and skills, with the ability to communicate with other disciplines, skills and also help them communicate amongst themselves. A role of conjunction and synthesis, originating for both from the same system of training pathways based on the multitude of disciplinary sectors involved (and therefore, on knowledge, goals, assessment prospects, methods, experiences, and languages), and on the capacity to tackle each research, intervention and/or project issue from various points of view and on an interdisciplinary basis.

Moreover, Design and Ergonomics work more in terms of problem-solving than abstract theoretical research, characterized by their sector of intervention rather than by their scientific or disciplinary area.

Last, but certainly not least, user centrality - or rather people centrality - is the most relevant aspect in the design and product development process. "User centrality" is the point of contact among the three areas, both in ethical terms, starting from the same definitions of Ergonomics, Design and Sustainability, and in methodological and operational terms.

As E. Manzini and C. Vezzoli in fact state, "(...) the transition to a sustainable society will necessarily consist of the social development of learning, thanks to which, amidst errors and contradictions - as always happens in learning processes - human society will gradually learn to live better by consuming (much) less and by regenerating the quality of its habitat, that is, of the global and local ecosystems and contexts of social life, in which humans have to live." ¹

"Designing for the people", i.e. designing for the needs, expectations (and desires) of the people who enter into relationships with objects, buildings, envi-

ronments, and technological and social systems is the common ground - both theoretical and operational - on which Ergonomics, Design, and Sustainability are all based.

A common ground offering a highly innovative approach to the project, which assesses, in a systemic perspective, the various research areas linked to security, usability, welfare, and health, of the three areas of Ergonomics, Design and Sustainability.

3. The construction of an integrated approach to the project: several research experiences in the field of everyday product design

In relation to my research area, the specificity and innovative value of the ergonomic approach to design are in its ability to assess the multiplicity of variables that define the user - product interaction (namely, the features and capabilities of users, the product characteristics and goals, the activities for which it is - or can be - used, and the characteristics of the physical and social context), in turn identifying and interpreting user requirements, expressed or unexpressed, in relation to this interaction.

With particular reference to Design for Sustainability, the ergonomic approach and the UCD approach may contribute greatly to the innovation of lifestyles and also to the way of using everyday products.

The main intervention areas of Ergonomics in Design in the sustainability sector include the field of everyday products and, in general, consumer products, design solutions for social housing and services for the home regarding the sharing of living facilities and of personal services, time management strategies, innovative solutions for energy saving, and conservation of resources, etc.

Design research on some of these issues is currently underway at the Faculty of Architecture of the University of Florence, specifically targeting the development of innovative solutions based on the User-Centered Design approach and aimed at proposing new ways to use everyday products in the domestic and intermodal mobility fields.

The first example involves the project called "Well Living: Ergonomics and Ecology in the kitchen" developed with the EFFETI company in the sector of household kitchens, where the analysis phase of user needs and expectations, allows for identifying areas of technological product innovation - said perfor-

¹ Manzini E., Vezzoli C., *Lo sviluppo di prodotti sostenibili*, Maggioli, Rimini 1998, 2004

mance and innovative services can be offered in a mature and consolidated field like that of household kitchens - both in terms of lifestyles and habits regarding the preparation and consumption of food, especially in relation to the proper use and saving of energy sources, waste reduction etc.. The research project was developed in 2009-2010 with joint experimental research and teaching at the Bachelor's Degree of "Design" at the University of Florence, funded by the Region of Tuscany in 2011.



Figure 1-2. Anja – design by Silvia Bicci, Daniele Busciantella Ricci, Giulia Caprili

Workshop "Well Living: Ergonomics and Ecology in the kitchen" developed by: Bachelor's Degree in "Design" Faculty of Architecture, University of Florence with EF-FETI company – coordinators: prof. Francesca Tosi, prof. Alessandra Rinaldi

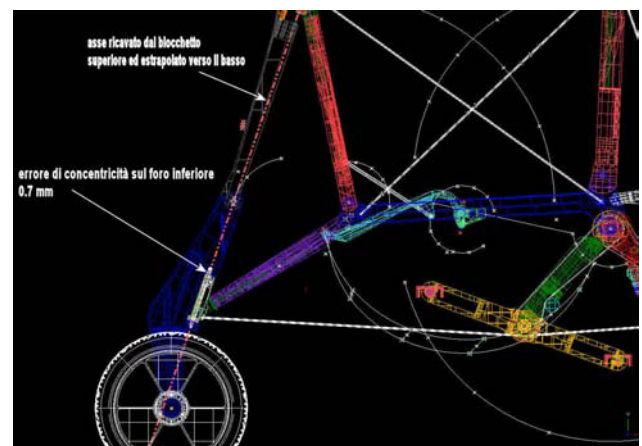
tutors: arch Simone Lucii, dott. Isabella Patti

The second example regards the research project conducted in the field of sustainable mobility and intermodality, "The intermodal bike, Multi-modal integration of cycling mobility through product and

process innovations in bicycle design," EU project - FP7-SST-2008-RTD -1 – funded in 2010, aimed at creating an easily transportable, folding bicycle in ultra-lightweight material for use on city tracks integrated with the public transport network.

The goal of this program is to develop ergonomic know-how related to the aspects of physiological and psychological "comfort" with specific reference to the compliance of the city/cruising bike with the usability, comfort and biomechanical, anthropometric and physiological compatibility requirements. More specifically, the goals include:

- The definition of a scientifically tested method for measuring and assessing the usability and comfort needs related to bicycles used mainly for urban and intermodal transfers.
- The selection of methods for evaluating the compatibility conditions of anthropometric and postural comfort specifically used for assessing the cycling mobility and the use of bicycles in urban areas.
- The definition of an ergonomic platform (geometric/dimensional matrix) for identifying the best postural trim for a city bike, in order to adapt the different sizes to a single shape and test it on a model.
- The synthesizing of the results in the best possible solution.
- The verification of the validity of the proposed model with tests conducted on models and users.



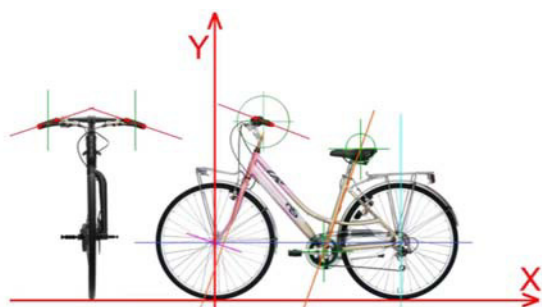


Figure 3-4. THE INTERMODAL BIKE, Multi-modal integration of cycling mobility through product and process innovations in bicycle design - FP7-SST-2008-RTD-1 – 2010-2013

Partners:

1. Tecnologie Urbane Srl TECNO Italy
2. Ticona GmbH TICONA Germany
3. University of Florence UNIFI Italy
4. TRILIX Car Design TRILIX Italy
5. MAXON Motors MAXON Switzerland
6. ATAF Florence ATAF Italy
7. LPP Ljubljana LPP Slovenia

Program scientific coordinator: arch. Alessandro Belli
 scientific coordinator for University of Florence unit:
 prof. Francesca Tosi, with: prof. Giulio Arcangeli, prof.
 Grazia Tucci, arch. Alessandra Rinaldi, dott. Marco Petranelli

References

- [1] L. Bandini Buti, *Ergonomia olistica, il progetto per la variabilità umana*, Franco Angeli, Milano 2008
- [2] P. Bertola, E. Manzini, *Design Multiverso*, Polidesign, Milano 2006
- [3] E. Manzini, F. Jegou, *Quotidiano sostenibile. Scenari di vita urbana*, Ambiente, Milano 2003
- [4] E. Manzini, C. Vezzoli, *Lo sviluppo di prodotti sostenibili*, Maggioli, Rimini 1998, 2004
- [5] G. Mantovani, *Ergonomia, lavoro, sicurezza e nuove tecnologie*, Il Mulino, Bologna 2000
- [6] D. Norman, *Emotional Design*, Basic Books, New York, 2004
- [7] D. Norman, *Living with complexity*, The MIT Press, Cambridge, Massachusetts, 2010
- [8] F. Tosi, *Ergonomia, progetto, prodotto*, Franco Angeli, Milano 2005
- [9] F. Tosi, *Ergonomia e progetto*, Franco Angeli, Milano 2006
- [10] I. McClelland, "Product assessment and user trials", in: Wilson J.R. e Corlett E.N., *Evaluation of Human Work*, Taylor & Francis, Londra - Philadelphia 1995
- [11] R. Verganti, *Design driven innovation*, Etas, Milano 2009
- [12] J. Zink Klaus, *Corporate sustainability as a challenge for comprehensive management*, Physica-Verlag, 2008