PROCEEDINGS of the HUMAN FACTORS SOCIETY—29th ANNUAL MEETING—1985

VOLUME I

PRESIDENTIAL ADDRESS

Progress for People ....................................................... Harry L. Davis

INVITED KEYNOTE ADDRESS

Some Reflections on Progress .......................................... Alphonse Chapanis

MECHANISMS OF VIGILANCE [Lecture]

Signal Detection Theory and Probability Matching Apply to Vigilance ........................................ Angus Craig

Automatic and Controlled Processing Approach to Interpreting Vigilance Performance .......................... Arthur D. Fisk

Information Processing in Vigilance Performance: Complexity Revisited ......................................... Joel S. Warm

William N. Dember

Thomas M. Lanzetta

John C. Bowers

Robert Lysaght

More on Cognitive Vigilance and Some Alternative Interpretations ............................................... Michel Loeb

Daniel W. Ash

Thomas K. Noonan

HUMAN FACTORS AND GERONTOLOGY, TWO PERSPECTIVES: INDUSTRIAL AND CLINICAL [Panel] ........................................ Sara J. Czaja

Margaret Hubbard Jones

James D. Baker

Martlin V. Faletti

James L. Fozard

INFORMATION-PROCESSING APPROACHES TO THE STUDY OF HUMAN-COMPUTER INTERACTION [Symposium]

Information-Processing Approaches to the Study of Human-Computer Interaction ........................ Scott P. Robertson

Discussion: Information-Processing Models ......................................................................................... John J. O'Hare

The Interaction of Task and Interface in the Development of Mental Models for an Acoustic Database ........ Kevin B. Bennett

Learning from Errors in Computer Text Editing .......................................................... 26

Scott P. Robertson

Methodology and Problem Representation in Programming ....................................................... 30

Deborah A. Boehm-Davis

User Strategies in Interactive Image Processing ................................................................. 31

James H. Howard, Jr.

Raymond J. Shaw

Scott P. Robertson

Jeffrey A. Raver

The Use of Signal Detection Theory in Research on Human-Computer Interaction ........................... 33

Raja Parasuraman

Gayle Wisdom

SHORT COURSES ON INTERNAL TRAINING WITHIN COMPANIES [Lecture]

Lockheed In-House Human Factors Engineering Training Course ............................................. 38

Stuart O. Parsons

Education—The Bridge between Research and Application .................................................. 40

George J. Burri

SAFETY POTPOURRI [Lecture]

A Measure of the Difficulty of Evacuating Elderly and Impaired Residents from Board and Care Homes ...................................................................................... 43

Norman E. Groner

Bernard M. Levin

Adult and Infantile Human Factors Safety—Beyond Building Codes and Ordinances ....................... 48

Leighton L. Smith

Setting Acceptable Levels of Safety for the National Airspace System ........................................ 52

Allen C. Busch

Brian F. Colamosca

Psychological Scaling of Expert Estimates of Human Error Probabilities: Application to Nuclear Power Plant Operation .............................................................................. 57

Kay Comer

Catherine D. Gaddy

David A. Seaver

William G. Stillwell

MENTAL WORKLOAD, ATTENTIONAL RESOURCES, AND DUAL-TASK METHODS [Lecture]

There's a Voice in the Sky; But Can a Picture Tell You More? .................................................. 61

Christopher P. Robinson

Ray E. Eberts

* Abstract only
** Manuscript not available for publication
The Interfering Effects of Processing Code on Visual Memory ........................................ Barry P. Goettl ........................................ 66
Assessing Subjective Workload Assessment: A Comparison of SWAT and the NASA-Bipolar Methods ........................................ Michael A. Vidulich, Pamela S. Tsang ........................................ 71
To Speak or Not to Speak: A Multiple Resource Perspective ........................................ Pamela S. Tsang, E. James Hartzell, Richard A. Rothschild ........................................ 76
Effects of Stimulus Complexity on Double Stimulation Tasks ........................................ N. Aykin, Sara J. Czaja ........................................ 81

HUMAN FACTORS IN TELECOMMUNICATIONS [Lecture]

Principles in Designing the 1984 Olympics Electronic Message System ........................................ Karen J. Rafnel ........................................ 86
Tactical Radio Communications Survey—A Pilot Study (HELCOMS-PS) ........................................ Russell M. Phelps ........................................ 91

HUMAN FACTORS ENGINEERING FOR SHIP SYSTEMS [Lecture]

A Selective Review of Navy Human Engineering Research and Development Programs ................... Robert A. Fleming, Clifford C. Baker, William Benson ........................................ 100

Human Engineering Implications of CBR Warfare on Ship Design and a Methodological Approach to Their Consideration ........................................ Theodore Marton, Paul D. Hunt, Jr. ........................................ 109

DATA ENTRY METHODS [Lecture]

The Long-Range Light Pen as a Head-Based User-Computer Interface: Head-Mounted “Sights” versus Head Positioning for Computer Access by the Disabled ........................................ Dennis B. Beringer, Julie Scott ........................................ 114
Two Experiments Investigating the Effects of Control-Display Gain and Method of Cursor Control on Touch Tablet Performance ........................................ Lynn Y. Arnault, Joel S. Greenstein ........................................ 122
An Experiment to Study Touchscreen “Button” Design ........................................ Mary Ann Valk ........................................ 127
Steps in the Development of a New Data Entry Device Based upon Two Hand Chord Keyboard ... Daniel Gopher, Hanna Hilsenharn, David Rai ........................................ 132

COMPUTER SOFTWARE EXCHANGE PROGRAM I [Lecture/Interactive]

Questionnaire Programs for Portable Computers ........................................ Colin G. Drury ........................................ 137
Structured Grading ........................................ Brian Peacock, Doug Stewart ........................................ 142
Computer-Based Activities for Teaching Engineering Psychology Concepts ........................................ Paul Reed ........................................ 147
Data Acquisition Control Software ........................................ Sudhakar L. Rangarajulu, William S. Marras, Thomas H. Rockwell ........................................ 151
Statistical Analysis Package for Biomechanical Data ........................................ Sudhakar L. Rangarajulu, William S. Marras, Thomas H. Rockwell ........................................ 154

ERGONOMIC DESIGN OF THE WORKPLACE [Lecture]

The Development of Two-Dimensional General Population Manikins for Deriving Workstation Ergonomic Requirements ........................................ Russell Church, Mark Phillips ........................................ 162
Hand Preference and Difference Patterns Using the Available Motions Inventory (AMI) .......................... 167
Mansour Rahimi
Don E. Malzahn
M. Hisham Musa

Thermography and Repetitive Stress Trauma: A Pilot Study ......................................................... 172
Michael W. Riley
Robert T. Sanwick
David J. Cochran

A Model for Estimating Maximal Aerobic Capacity .......................................................... 176
Fariborz Tayyari
Jerry D. Ramsey

ASSESSING THE EFFECTS OF INDIVIDUAL DIFFERENCES ON MENTAL AND PHYSICAL WORKLOAD [Lecture]

Analysis of the Effects of Two Individual Differences Classification Models on Experiencing Mental Workload of a Computer Generated Task: A New Perspective to Job Design and Task Analysis .......................................................... 178
Michelle M. Robertson
Najm Meshkati

Assessment of SWAT Accuracy .................................................. 183
Mark E. Revesman
Stephen M. Rokicki

Behavior Analysis: A Tool for Test and Evaluation ........................................................................ 188
Samuel G. Charlton

Influence of Modern Technology on Human Capabilities .......................................................... **
Mohamed Y. Beshir
Hala A. Hafez

COMPUTERS FOR TRAINING, INSTRUCTION, AND INFORMATION RETRIEVAL [Lecture]

Computer-Based Instruction (CBI): Toward a User-Oriented Technology Data Base .................. 193
Grace P. Waldrop
Norman E. Lane

Effectiveness and Efficiency of Computer-Based Training: Recent Research Findings ................ 196
Barbara Babbitt
William Pieper
Clarence Semple
Dianne Swanson

Human Factors in the Design of Technical Information: A Case Study ........................................ 202
Robert J. Smilie

Critical Variables in Start-Up Training for Multi-Functional Information Systems ...................... 206
Mary L. Stoddard

AN OVERVIEW AND UPDATE OF THE AMRL WORKLOAD PROGRAM [Symposium]

Methods and Systems for Measuring Human Performance Capabilities .......................................... 210
Clark A. Shingledecker
Mark S. Crabtree
F. Thomas Eggeemeier

Workload Measurement in System Design and Evaluation .......................................................... 215
F. Thomas Eggeemeier
Clark A. Shingledecker
Mark S. Crabtree

The Development of an Air Force Mil-Standard for Workload .................................................. **
Robert D. O'Donnell

Current Status of the Development of the Subjective Workload Assessment Technique ................ 220
Gary B. Reid

A Neuropsychological Test Battery for Workload Assessment .................................................. 224
Glenn F. Wilson

HUMAN MODELS: STATE OF THE ART [Panel]

Harold P. Van Cott
Richard Pav
Joseph G. Wohl
Judy Kornfeld
Donald Topmiller
Robert Seidel

MORE ON AGING’S EFFECTS AND HUMAN FACTORS [Lecture]

Age-Dependent Changes in Information Processing Abilities Between 20 and 60 Years .............. 226
Rolf Braune
Christopher D. Wickens
Dave Strayer
Alan F. Stokes

Legibility of Telephone Directories: Reductions Due to Compressed Print and Disproportionate Effects for the Aged .................................................. 231
Robert E. Morrison
Keith Rayner

Another Look at the Effects of Age Cohort, Job Family and Task Variety on Industrial Accident Rates .................................................. 235
John K. Schmidt
Barry L. Petree
James P. McDaniel
Kevin W. Olive
Nigel B. Lamont

EVALUATION OF INTERFACES [Lecture]

Collecting Detailed User Evaluations of Software Interfaces .................................................. 240
William D. Coleman
Robert C. Willigises
Dennis R. Wixon

* Abstract only
** Manuscript not available for publication
How Operating Systems Are Used: A Comparison of VMS and UNIX ........................................ 245
  Dennis Wixon
  Mark Bramhall

An Experimental Comparison of a Windowed vs. a Non-Windowed Operating System Environment... 250
  Susan E. Davies
  Kevin F. Bury
  Michael J. Darnell

DESIGNING PRODUCTS FOR PEOPLE [Lecture]

Strength Considerations for Product Safety Assessments.................................................. 255
  Margery Davidson Boulette

The Effects of Toeclips and Cleats on Bicycle Efficiency.............................................. 260
  Daniel K. McAnarney
  Stephan A. Konz

The Effect of Driving Factors on Spinal Loading .................................................................. 264
  E. N. Corlett
  A. G. Rose

Torque Characteristics for a Consumer Sample ................................................................. 266
  John G. Kreifeldt

Analyzing Performance Features and Benefits of an Antistatic, Antiglare Panel ................. 287
  William R. Grenawalt

HIGHWAY SAFETY [Lecture]

Driver Perception of Risk: Objective Risk versus Subjective Estimates............................ 270
  Christine Philput

A Successful Program for Increasing Occupant Safety Belt Usage .................................... 273
  Gary L. Rupp
  John J. Dueweke

Improving Motorcyclists' Braking Performance: The Integrated Brake System................... 274
  Rudolf G. Mortimer

Hand Position and Motorcycle Front Brake Response Time .............................................. 278
  D. R. Thom
  H. G. Arao
  P. A. Hancock

Resolving the Moped Rider's Dilemma ................................................................................. 282
  A. James McKnight

DISPLAY SIMPLIFICATION, VISUAL SEARCH, AND DECLUTTERING [Lecture]

The Precedence of Global Features in the Perception of Map Symbols ............................. 287
  Beverly G. Knapp

Feature Positive Coding Effects on Object Localization ...................................................... 292
  Denise L. Wilson
  R. Kevin Burns
  Gilbert G. Kuperman

The Impact of Scene Digitization on Distance Judgments ................................................ 297
  Nancy B. Mitchell

Decluttering Methods for High Density Computer-Generated Graphic Displays ............... 300
  E. Eugene Schultz, Jr.
  David A. Nichols
  Patrick S. Curran

A Peripheral Integrated Status Display: Is It Really Giving the "Big Picture" or Is It a Miniserles?..... 304
  Dennis B. Beringer

COMPUTER SOFTWARE EXCHANGE PROGRAM II [Lecture/Interactive]

Simulation of Ramp-Freeway Accident ............................................................................. 308
  Thomas H. Rockwell
  Steven M. Kieger
  Sudhakar L. Rangarajulu

Dynamic Biomechanical Model for Lifting Activities—A Microcomputer Program ............ 310
  Andrew Y. H. Liou
  Bernard C. Jiang
  James L. Smith

An Undergraduate Laboratory Exercise on the Biomechanics of Lifting .......................... 315
  S. Keith Adams
  Patrick E. Patterson

A Micro-Computer Based Algorithm to Predict Body Fat Density .................................... 320
  Jerome J. Congleton
  James L. Smith
  Donald R. Smith

THE STUDY OF HUMAN FACTORS IN COMPLEX SYSTEMS [Symposium]

Human Factors in Complex Systems .................................................................................. 323
  Neville Moray

Human Factors Attitudes and the Approach to Advanced-Technology Problems ............. 327
  Lissanne Bainbridge

Knowledge Based Development of Graphic Display Systems ......................................... 325
  David D. Woods

Experimental Studies of Process Control ............................................................................ 330
  Neville Moray
  Ira Rotenberg

An Experimental Approach to Validating a Theory of Human Error in Complex Systems .......... 333
  Nancy M. Morris
  William B. Rouse

* Abstract only
** Manuscript not available for publication
The Elicitation of Human Knowledge about Complex Systems
Penelope M. Sanderson

DESIGN SUPPORT FOR OLDER ADULTS [Lecture]
Development of a Practical Computer Interface for the Visually Impaired
Brian K. Paul
The Role of Seating Types in Egress Difficulty Experienced by Older Adults: A Biomechanical Analysis
M. Charlie Clark
Martin V. Faietti
Developing Residential Design Statements for Older Americans
Allen Abend
Alexander Chen
Reciprocal Drive Wheelchair
Roger D. Goodwin

EXPERT/KNOWLEDGE-BASED SYSTEMS [Lecture]
Development of a Knowledge-Based Simulation Model to Verify Operability in a Complex Combat System
Robert Dick
Renwick Curry
E. M. Roth
G. S. Elias
M. L. Mauldin
W. W. Ramage
Cognitive Engineering Issues in the Design of a Knowledge-Based Information Retrieval System
Philip J. Smith
Deborah A. Krawczak
Steven J. Shute
Mark Chignell
User Interface Design for Maintenance/Troubleshooting Expert System
Christopher G. Koch

CREATING METHODS AND ENVIRONMENTS FOR ORGANIZATIONAL COMMUNICATION AND DESIGN [Lecture]
Communicational Climate and Communicational Effectiveness
Dan Zakay
Strategies for Improving Organizational Communication: Case Studies of Nuclear Power Plants Revisited
Marjorie B. Bauman
Marjorie Davidson Boulette
Harold P. Van Cott
Real-Time Computer-Mediated Conferencing versus Electronic Mail
Vitaly Dubrovsky
Development of Workstation Design Criteria for Current Office Environments: A Case Study
P. A. Hancock
J. H. Stout
B. Medeiros
S. Rosenberg
R. Koffler
The Rocky Road from Work System Design to Change Implementation
James W. Suzansky

BASIC ISSUES IN TRAINING AND PERFORMANCE [Lecture]
The Contribution of Training Effectiveness Analysis in the Army
Gilbert L. Neal
Thomas L. Paris
Eye-Scan Behavior in a Flight Simulation Task as a Function of Level of Training
James R. Comstock
Glynn D. Coates
Raymond H. Kirby
A Demonstration of Surface Warfare Advanced Training Technology
Richard E. Reynolds
Eduardo Salas
Pro-SWAT Applied to Advanced Helicopter Crewstation Concepts
Gilbert G. Kuperman
The Effects of Presentation Method, Type of Knowledge Presented, and Problem Solving Style on Goal Transformation and Knowledge Proceduralization in Geometry Instruction
Richard H. Vranesh
Learning and Performance in an Air Refueling Part-Task Trainer: Preliminary Data Analysis
John E. Stewart II

VISUAL PERFORMANCE POTPOURRI I: VISION, INFORMATION SCANNING, AND RETRIEVAL [Lecture]
Binocular Scanning Performance of Soldiers Wearing Chemical Biological Protective Masks
David M. Harrah
Evaluation of a Video Storage System for Intrusion Detections
Betty P. Chao
Information Scanning Patterns and Retrieval Strategies of Well-Trained Documentation Users
Mark W. Scerbo
Arthur D. Fisk
Steven R. Marty
The Saccadic Eye Movement Control System 427
Jeff Hendrickson

Shadow Mask Display Visibility: Human Thresholds for Perception of Miconvergence Effects 431
Oliver K. Hansen

AUTOMOTIVE HUMAN FACTORS: RESEARCH AND APPLICATIONS [Symposium]

Chess Model Applications to Study Improvements in Driver's Night Visual Performance 436
Vivek D. Bhise

Rocker Switch Tactile Coding and Direction of Motion Stereotypes 437
Daniel D. Jack

Is Human Factors Ready for the Automobile? 442
Lyman M. Forbes

Describing Truck Driver Eye, Head, Stomach, Knee, and Seat Locations in Heavy Truck Space 443
Nancy Philippart
James Stanick
Timothy Kuechenmeister

Driver Eyelapses Produced by Minimum Deflection Seats and by U.S. Adult Population Changes 447
Albert J. Arnold
R. A. Ferrara
T. J. Kuechenmeister

Drivers' Response to Safety Countermeasures 447
Leonard Evans

Crash Avoidance Research Sponsored by the National Highway Traffic Safety Administration 447
Robert M. Nicholson

Human Factors in the Automotive Design Process 447
Dick Scott

COMPARATIVE EFFECTS OF 19 STRESSORS ON TASK PERFORMANCE [Symposium]

Stress and Sonar Operations: Concerns and Research Methodology 452
Malcolm J. Smith
Robert R. Mackie
C. Dennis Wylie

Comparative Effects of 19 Stressors on Task Performance: Major Results of the Operator Survey 457
C. Dennis Wylie
Robert R. Mackie
Malcolm J. Smith

Comparative Effects of 19 Stressors on Task Performance: Critical Literature Review (What We Appear to Know, Don't Know, and Should Know) 462
Robert R. Mackie
C. Dennis Wylie
Malcolm J. Smith

PROTOTYPING I [Lecture]

Software Prototyping as a Human Factors Tool 467
Mike Pfauth
Ann Hammer
Jim Fissel

The Rapid Development of User Interfaces: Experience with the Wizard of Oz Method 470
Paul Green
Lisa Wei-Haas

Tool Sharpening: Designing a Human-Computer Interface 475
R. S. Fish
K. Gandy
D. L. Imhoff
R. A. Virzi

User Partnership in System Design and Data Administration 480
Andrew M. Cohill
Linda Harper-O'Donnell
Frank P. Curran

COMPUTER TECHNIQUES IN HUMAN FACTORS [Lecture]

Integration of Principles of Human Factors into an Undergraduate Computer Technology Curriculum: A Case Study 485
Susan C. Hoffman

The Computer Readability Editing System 489
J. Peter Kincaid
Susan Schalow

The Design of Computer-Based Instruction: Techniques from Function Allocation 494
Richard Halstead-Nussloch

Human Factors Engineering Test and Evaluation in the U.S. Military 499
Thomas G. O'Brien

MUSCULAR CAPACITIES OF PEOPLE AT WORK [Lecture]

Investigation of the Effect of Exertion Length on Measured Isometric Strength 504
James E. Mogensen
Terrence J. Stobbe

Predictive Models of Isokinetic Upper Extremity Strength 508
Shaik N. Imrhan
Mohamed M. Ayoub

Use of Simulated Job Dynamic Strength (SJDS) in Screening Workers for Manual Lifting Tasks 513
Anil Mital
Waldemar Karwowski

Repeatability of Dynamic Strength Tests 517
Krishna K. Menon
Andris Frievalds

* Abstract only
** Manuscript not available for publication
Biomechanics and Work Physiology in Underground Mining ........................................... 521
J. L. Selan
M. M. Ayoub
J. L. Smith
J. Peey

HUMAN FACTORS IN ACCIDENT ANALYSIS [Lecture]

Pilot Error Accidents: A Total System Approach to Analysis ........................................ 526
Paul G. Stringer
Daniel D. Riley

Use of Written Simulations in Accident Research and Safety Training .......................... 531
David M. DeJoy

An Analysis of 4923 Industrial Accidents ................................................................. 536
Kenneth R. Laughery, Sr.
Douglas J. Brems

Patterns of Drowning in Residential Pools, Hot Tubs, and Spas: Intended versus Non-Intended Usage ................................................................. Victoria R. Brown

ERGONOMICS [Lecture]

Effects of Thermal Stress and Chemical Protective Clothing on Speech Intelligibility ........ 541
Richard F. Johnson
Lynn A. Sleeper

Tractor Ergonomic Requirements Based on North American and European Operator Interviews ................................................................. 546
Steven M. Casey

Helicopter Crew Evaluations on the Effects of Vibration on Performance ........................ 550
Robert P. Bateman
Richard P. White

A New Model for the Evaluation of Recovery from Sub-Maximal Static Loading ............. 554
N. Milner and E. N. Corlett

PROTOTYPING II [Lecture]

A Method for Assessing the Human Factors Impacts of Increased Automation ............... 556
Sylvie B. Sheppard
Elizabeth D. Murphy
Lisa J. Stewart

IDEF-O, a Tool for Planning and Problem Solving .......................................................... 561
Douglas J. Funke
Robert F. Bachert

Queueing Network Theory Applied to Manned System Performance Prediction ............... 566
Gerald P. Chubb
Richard A. Miller

The Iterative Design of a New Text Editor ................................................................. 571
Michael Good

ENVIRONMENTAL POTPOURRI I [Lecture]

Designing Industrial Workspaces to Be More Livable .................................................. 575
Michael E. Wiklund

A Human Factors Approach to the Design of an Animal Euthanasia Workstation ............ 580
Daniel E. McCrobie

Zonal Differentiation of Performance under Heat Stress .............................................. 585
P. A. Hancock
A. A. Behnke

Cultural Differences in Color Preferences ................................................................. 590
Thota V. Reddy
Corwin A. Bennett

Three Comparisons of Incandescent and Fluorescent: Color or Luminaire? ................. 594
Corwin A. Bennett
Anjiraju Perecherla
Zahirul K. Owodhury
Ramachandran Prabhakaran
Shyam N. Gettu

MANAGING ORGANIZATIONAL AND PRODUCT DESIGN CHANGES [Lecture]

Technological Change and Individual Adjustment ......................................................... 598
Mica Robertson Endsley

The Use of Sociotechnical Analysis and Statistical Process Control to Develop a Quality Improvement Program ................................................................. 603
Stephen W. Sorensen
Steven L. Dockstader
Martin J. Molof

A Test of the Quality Circle Approach to Problem Solving .......................................... 608
Robert F. Henry
Frederick V. Malmstrom

Human Factors in IBM .......................................................................................... 611
John C. Thomas

TRAINING IN DoD: ROLE OF THE TRAINING DATA ANALYSIS CENTER [Panel] ........ 615
Tom Sicilia
Alfred F. Smode
Donald Haggard

VISUAL DISPLAYS AND VDT USAGE [Lecture]

Head-Up Display (HUD) Utility, II: Runway to HUD Transitions Monitoring Eye Focus and Decision Times ................................................................. 615
Daniel J. Wexner
Richard F. Haines
Robert J. Randle

Displays, Acquisition and Performance ................................................................................ 620
Laura D. Silver

* Abstract only
** Manuscript not available for publication
Preferred Declination of the Line of Sight .......... 625
Susan G. Hill
Karl H. E. Kroemer

VDT Operator Pupil Diameter Changes, Accommodation Changes and Subjective Comfort/Discomfort Score Changes over a Working Day .......... 630
Helmut T. Zwahlen
Andrea L. Hartmann

AUTHOR INDEX .................. (follows page 634)

VOLUME II

WORKLOAD I [Lecture]

Subjective Mental Workload, Attribution, and Locus of Control .......... *
Penelope M. Sanderson
Kim J. Vicente
D. Craig Thornton

A Workload Analysis for Strategic Conventional Standoff Capability Missions .......... 635
Gilbert G. Kuperman
Denise L. Wilson

The Psychophysiology of Workload—A Second Look at the Relationship between Subjective Measures and Performance .......... 640
Daniel Gopher
Nella Chillag
Nira Arzi

MENUS AND COMMANDS [Lecture]

The Relative Effectiveness of Alternative Selection Strategies in Menu Driven Computer Programs .......... 645
David Shinar
Helman I. Stern
Gad Bubis
David Ingram

Optimizing the Set of Highlighted Options on Video Display Terminal Menus .......... 650
Donald L. Fisher
Bruce G. Coury
Tammy O. Tengs

Using Cognitive Models to Create Menus .......... 655
Kathleen M. Snyder
Alan J. Happ
Lawrence Malsig
Kenneth R. Paap
James R. Lewis

Methods of Disambiguating Command Term Abbreviations for Interactive Computer Systems .......... 659
Benjamin L. Somberg
Kelly E. Dotson

PRODUCT SAFETY AND WARNINGS [Lecture]

Perceived Effectiveness of Environmental Warnings .......... 664
Michael S. Wogalter
David R. Desaulniers
Sandra S. Godfrey

Warnings: Do They Make a Difference? .......... 669
Sandra S. Godfrey
Pamela R. Rothstein
Kenneth R. Laughter

Slope Safety Warnings for Riding-Type Lawn Mowers .......... 674
Neil D. Lerner

Behavioral Effectiveness of Warnings .......... 679
Michael S. Wogalter
Gail A. Fontenelle
Kenneth R. Laughter

Designing Warnings to Be Read and Remembered .......... 684
Pamela R. Rothstein

ENVIRONMENTAL POTPOURRI II [Lecture]

VDT Strain: Psychological Strain or Physical Basis? .......... 689
Michael J. Smith

Automated Determination of Reach Envelopes .......... 694
J. H. Stramler

Applicability of Using the CAR-II Model in Design and Evaluation of Multioperator Workstations with Shared Controls .......... 698
Stephen J. Morrissey
B. E. Herring
M. G. Gennetti

Patient Falls and Related Variables: An Examination of Environmental Design and Safety .......... 702
Glenn P. Leighbody
Dorothy Andrews
Kathleen Long

Quantifying the Subjective Evaluation of Occupied Space .......... 706
F. H. Rohles, Jr.
J. E. Laviana

VISUAL PERFORMANCE, HAZARD DETECTION, AND HIGHWAY DRIVING [Lecture]

Age-Related Changes in Distance Judgments .......... 711
Gregory W. Hill
Donald H. Marshon

The Effect of Alcohol on Contrast Sensitivity .......... 715
Arthur P. Ginsburg
David W. Evans
Ken Blauvelt
Linda McNinch