2012 ADVANCE PROGRAM

THE ONE EVENT TO GAIN CRITICAL KNOWLEDGE AND ENHANCE YOUR TECHNICAL EXPERTISE. FABTECH 2012.

INSIDE:

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FABTECH
AWS WELDING CCAI FMA SME PMA METALFORM

North America's Largest Metal Forming, Fabricating, Welding and Finishing Event

November 12-14, 2012
Las Vegas Convention Center

Sponsors

REGISTER EARLY & SAVE!
fabtechexpo.com

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Las Vegas, Nevada
North Hall Booths:
N4102, N4113, N4515

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The Quality You Expect.℠

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EXPERIENCE FABTECH

North America's Largest Metal Forming, Fabricating, Welding and Finishing Event

Experience the ultimate thrill of FABTECH 2012—a place where you can see and compare cutting-edge equipment and technology in action on the show floor. Check out all the new products, network with industry pros and find solutions to work smarter and be more competitive. There's nothing else like it!

Connect with Leading Suppliers

Over 1,100 leading manufacturers all in one place at one time. Meet with vendors who offer cost-saving solutions and are ready to help solve your toughest production challenges.

Source New Products

Compare hundreds of the latest products and services, including live demos of full-scale machines. Preview exhibitor-led new product presentations at the two FABTECH Theaters located in North and Central Halls during show hours.

Sharpen Your Skills

FABTECH offers an unparalleled educational lineup with 100+ sessions, conferences, seminars and a professional program. Learn from the industry's leading experts and find new strategies and techniques to enhance your business and advance your career.

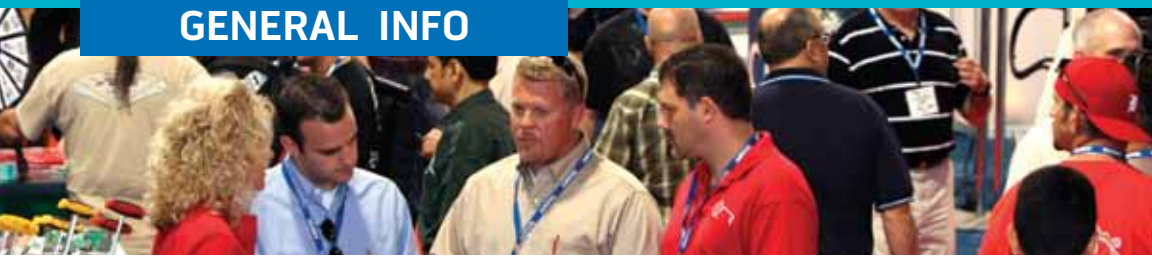
Network and Collaborate

Meet face-to-face with product experts, industry colleagues and potential partners. Reconnect with old friends and make new connections before, during and after the show.

ADVANCE PROGRAM VOLUME 1, ISSUE 1
AUGUST 2012

The *Advance Program* is published annually on behalf of FABTECH® by
The Fabricators & Manufacturers Association, International®
833 Featherstone Road | Rockford, Illinois 61107-6302 USA
815-399-8700 • www.fmanet.org | www.fabtechexpo.com

GENERAL INFO



FIND PRODUCTS AND SOLUTIONS IN THE FOLLOWING TECHNOLOGY CATEGORIES:

Assembly
Bending & Forming
Brazing & Soldering
Business Services
Coil Processing
Cutting
Fastening & Joining
Finishing/Paint & Powder Coating
Finishing/Plating
Gases & Gas Equipment
Hydroforming
Inspection & Testing
Job Shop/Contract Mfg.
Lasers
Lubrication
Maintenance & Repair
Material Handling
Metal Suppliers
Plate & Structural Fabricating
Press Brakes
Punching
Resistance Welding
Robotics
Roll Forming
Safety & Environmental
Saws
Software, Machine Controls
Stamping
Thermal Spraying
Tool & Die
Tooling
Tube & Pipe Fabricating or Welding
Tube & Pipe Producing
Waterjet
Welding Consumables
Welding Machines

SHOW LOCATION

Las Vegas Convention Center
3150 Paradise Rd
Las Vegas, NV 89109

SHOW HOURS

MONDAY, NOVEMBER 12 . . . . . 9:00 a.m. – 6:00 p.m.
TUESDAY, NOVEMBER 13 . . . . . 9:00 a.m. – 5:00 p.m.
WEDNESDAY, NOVEMBER 14 . . . . . 9:00 a.m. – 4:00 p.m.

HOW TO REGISTER

Register today online at fabtechexpo.com. Or, download a printer-friendly registration form from the Web site and fax to (508) 743-9696.

Register before November 9, 2012 for complimentary show admission. SAVE $50!

SEE, TOUCH AND COMPARE THOUSANDS OF PRODUCTS FROM OVER 1,100 EXHIBITORS

Exhibitor list by pavilion as of 7/23/12. Go to **fabtechexpo.com** for the most up-to-date list of FABTECH exhibitors.

FINISHING

ACT Test Panels LLC
AFC Finishing Systems
AkzoNobel Powder Coatings
Alliance Express
American Finishing Resources
Amiberica Inc
Anest Iwata USA Inc
Anomatic Corp
Arkema Inc
Baril Coatings USA
BECCA Inc
BigC: Dino-Lite Scopes
Binks DeVilbiss Ransburg BGK
Bulk Chemicals Inc
C.A. Technologies Inc
Calvary Industries Inc
Cardinal Paint and Powder
Carpenter Chemicals LC
Catalytic Industrial Systems
CFCM Canadian Finishing & Coatings Manufacturing
Chemetall US Inc
Chemical Coaters Assoc Int'L
Clean Air Consultants/ Filter 1
Coil World Magazine
Col-Met Spray Booths Inc
Combustion and Systems Inc
Coral Chemical Co
Custom Fabricating & Supplies
Decoral System USA Corp
DeFelsko Corp
Diamond Vogel Paints
DMP Corp
DuBois Chemicals
DuPont Industrial CoatingSolutions
Durr Ecoclean Inc
Dynabrade Inc
Eisenmann Corp
Elcometer Inc
Electrocoat Association,The
Electro-Steam Generator Corp
ElektroPhysik USA Inc
EPSI Masking Co
EXEL North America
Fischer Technology Inc
Fostoria Process Equipment
Gema
General Automatic Transfer
General Fabrications Corp
George Koch Sons LLC
Global Finishing Solutions
Goff Inc
Graco Inc
Guspro Inc
Hubbard-Hall Inc
I.S.T. International Surface Technologies
Inline Sieve
Intech Services Inc
IntelliFinishing
Jervis B Webb Co

FINISHING

Kaeser Compressors Inc
KCI America Co Ltd
Keyland Polymer Ltd
KMI Systems Inc
Kolene Corp
Krautzberger Gmbh
LDPI Inc
LPI Inc
Magic Rack/Production Plus Corp
Midwest Finishing Systems Inc
Mighty Hook Inc
MTM Meissner
NIC Industries Inc
Nordson Corp
Nova Verta USA
Osborn
Parker Ionics/Parkwood Engineering
PKG Equipment Inc
Pneu-Mech Systems Manufacturing Inc
Pollution Control Products
Porcelain Enamel Institute Inc
Powder Coating Consultants
Powder Coating Magazine
Powder Parts Inc
PPG Industries
Precious Plate Inc
Pretreatment Equipment Mfg Inc
Production Systems Inc
Products Finishing Magazine
Protech Powder Coatings
Quaker Chemical Corp
Rapid Engineering
Red-Ray Manufacturing Co Inc
Reliant Finishing Systems
Richards-Wilcox Inc
Rohner
Shercon Inc
Southern Systems Inc
Spray-Tech/Junair
Steelman Industries Inc
Strathmore Products Inc
TWN Industries Inc
Uni-Spray Systems Inc
Vitracoat America Inc.
Vulcan Catalytic Infrared Oven Systems
Wagner Industrial Solutions
Walther Pilot North America
Webb-Stiles Co

FORMING & FABRICATING

5S Supply
A&V Waterjet Tech Inc
Abtex Corp
Accurpress America Inc
Accustream Inc
AceCad Software
Acrotech Inc/Di-Acro Div of Acrotech
Advanced Laser Services Llc
Advanced Manufacturing Solutions LLC

FORMING & FABRICATING

Aerospace Manufacturing and Design
Air Products and Chemicals Inc
AKS Cutting Systems Inc
Akyapak
Alabama Economic Development
Alliance Machine and Engraving LLC
Alma Cam USA LLC
Aloris Tool Technology Co
Alro Steel Corporation
Alternative Parts Inc
AM Machinery Sales
Amada America Inc
Ambrell Precision Induction Heating
American Express Open
American Machine & Rollform Tech
American Photonics
American Punch Co
American Roll Form
ARKU Coil Systems Inc
Armstrong Kover Kwick Inc
Arro-Mark Co LLC
Arrowhead Manufacturers & Fabricators Assoc
ASKO Inc
Athader
Atlantl Inc
Attexor Clinch Systems SA
Automec Inc
AZ Metalworker
AZZ Galvanizing Services
Baileigh Industrial Inc
BandSawParts.com
Barton
Bascon Inc
Baykal Makina Sanayi ve Ticaret AS
Beck Automation
Beckhoff Automation
Behringer Saws Inc
Betenbender Manufacturing Inc
Big Ass Fans
Blastec Inc
Bosch Rexroth Corp
Boschert Precision Machinery Inc
Bowlin Engineering
Box On Demand by Plymouth Packaging
Bradbury Co., Inc., The
Bradbury Group Australia
Bruker Elemental
BTM Bandsaws
Bunting Magnetics Co
Burghardt + Schmidt GmbH
Burr King Manufacturing Co
Butech Bliss
BUWW Coverings Inc
Bystronic Inc
C Marshall Fabrication Machinery
California Cold Saw
Cambco Inc

FORMING & FABRICATING

Cambridge Lee Industries LLC
Carell Corp/Eagle Bending Machines
Cedar Valley Region of Iowa
Centricut
CH Steel Solutions Inc
Chicago Pneumatic Tool Co
Chicago Slitter
Cidan Machinery Inc
CIMID Corp
Cleveland Punch & Die Co
Cleveland Steel Tool Co
CMF Jammes Rolling and Welding
CML USA Inc Ercolina
CNA Insurance
CNC West
Coherent Inc
COLE-TUVE Inc
Combilift USA
COMEQ Inc
CONCOA Inc
Controlled Automation Inc
Cordstrap Canada Corp
Corporate Finance Associates - Chicago
Cosen Saws USA
Costa & Grissom Machinery Co
CR Cuscinetti A Rulli Srl
Crest Steel Corporation
Cut Technologies Metal LLC
Daito USA Inc
Dake Corporation
Darex LLC
DAVI Inc
Delta Heat Treating
Delta Steel Technologies
Detroit Tool Metal Products
DoALL Sawing Products
Donaldson Torit - Donaldson Company Inc
Doringer Cold Saws
Douglas Steel Supply Co
Dr Shrink Inc
DuBois Chemicals
Durma/SCA
Eberle America Inc
Econco/CPI
Edwards Manufacturing Co
Elumatec North America Inc
Emmegi USA Inc
Enco Manufacturing Co
Enutron International
Epicor Software Corp
ERIEZ
Ermak USA
Ervin Industries
ESCO Tool Co
Euromac/ Metal Finish LLC
Expansion Solutions Magazine
Fabricating & Metalworking Magazine
Fabricator, The
FabSuite

FORMING & FABRICATING

FabTrol Systems Inc
Faccin USA Inc
FARO Technologies Inc
Felton Inc
Ficep Corporation
Fladder-Hansen & Hundebol Inc
Flexarm Inc
Flow International Corp
FomUSA
Formtek Metal Forming & Hill Engineering
Friggi N.A. Inc
FW Gartner Thermal Spray
Gasparini SPA
Generon IGS
GINGRAS/ Machinerie G A S
Global Shop Solutions
GMA Garnet USA Corp
GMC Machine Tools Corp
Gostol TST d.o.o
Greenberry Industrial
H2O JET Inc
Haberle / Ken Bergman & Assoc LLC
Haco Atlantic Inc
Haco-Lasit
Haeger Inc
Haeusler AG
Halifax Rack & Screw
Hangzhou Xiangsheng Abrasive Machine Manufacturing Co., Ltd
Hans Weber Sales and Service Corp
Hayes International
HE&M Saw Inc
Heck Industries
Henkel Corp
Henning Industrial Software Inc
Heritage Packaging
Herr Voss Stamco
HGG Profiling Equipment
Hougen Manufacturing Inc
Hyd-Mech Group Ltd
Hydro Carbide Inc
Il-VI Infrared
IMS Systems Inc
IMS Waterjet, Inc.
Industrial Laser Solutions
Industrial Machine Trader
Industrial Machinery Digest
Industrial Magnetics Inc
Industrial Market Place
Industrial Molded Rubber Products
InfoSight Corp
Infra Metals
International Knife & Saw Inc
International Technologies Inc
International Waterjet Parts
ISB Group
Jet Edge
JETCAM- NestONE Solutions
Jet-Wilton

FORMING & FABRICATING

Jing County Anhui Haori Import & Export Trading Co Ltd
JMR Industrial
JMTUSA
Job Shop Company, The
Jobscope Corp ERP
Kaitech
Kasto Inc
Kern Electronics & Lasers
Ketec Precision Tooling Co LTD
Kinetic Cutting Systems Inc
KMT Waterjet Systems Inc
KNUTH Machine Tools USA Inc
Komatsu America Industries LLC
Lambda Research Optics Inc
Lambie Engineering LLC
Lantek Systems Inc
Laser Experts Inc
Laser Mechanisms Inc
Laser Research Optics
LaserRite (American BiltRite)
LaserStar Technologies Corp
Lazer Safe Pty Ltd
Lean Enterprise Training
Leifeld Metal Spinning AG
LENOX
Leveltek Intl LLC
Lissmac Corp
Long Haul Trucking
LS Industries Inc
LS Starrett Co, The
LT Ultra Precision Optics
LVD Strippit
M K Morse Co, The
Machine Concepts Inc
Machinery Marketing Inc
Magestic Systems Inc
Magnetic Products Inc
Main Steel
Manrepco Inc
Manufacturing News
Marion Die & Fixture Inc
Marvel Manufacturing Co
Maryland Metals Processing
Masteel America Corp
Master Magnetics
Mate Precision Tooling
Mazak Optonics Corp
MB Metal Technologies
MC Machinery Systems Inc/Mitsubishi
Measurement Systems Intl
Mecco Marking & Traceability
MegaFab-Piranha Whitney-Bertisch
Messer Cutting Systems
Metalix CAD/CAM Ltd
MetaMation Inc
Metcast Service Tech Resources
Metform International Ltd
Metlsaw Systems Inc

EXHIBITOR LIST

Interested in Exhibiting? Visit ***fabtechexpo.com/reserve-booth.com*** *to learn how your company can take part in this exciting event!*

FORMING & FABRICATING

Midwest Tool Inc
MIE Solutions Inc
Modern Manufacturing Technologies
MultiCam Inc
Murata Machinery USA Inc
Nadella
Nebraska Public Power District
NIST
Nitto Denko America Inc
Norlok Technology Inc
North Carolinas Southeast
Northrop Grumman
Nufern
Ocean Machinery Inc
OMAX Corp
Oncor
O'Neal Flat Rolled Metals
Ophir Optics Inc
OR Lasertechnology Inc
Panasonic Electric Works Corp of America
Pangborn Corp
Pannier Corp
Parke Filtration and Separation
Pat Mooney Inc
Peddinghaus Corp
Perfection Machinery Sales Inc
Permabond Engineering Adhesives
Peter Prinzing GmbH
Phinney Tool & Die Co Inc
Polyurethane Products Corp
Prestige Equipment Corporation
Prima Power North America Inc
Prodevco Industries Inc
Prodim USA
Project Tool & Die Inc
Punch Press
PythonX-Burlington Automation
Radan Planit Solutions Inc
RAS Systems LLC
Red Bud Industries
Richardson Electronics Ltd
RMI Laser LLC
Rocky Mountain Instruments Co (RMI)
Roentgen USA
Roll Forming Corp
Roller Die + Forming Co
Rosler Metal Finishing USA LLC
Ruko Tool Inc
Sahajanand Laser Technology Ltd
Salvagnini America Inc
Samson Roll Formed Products Co
Sawblade.Com
Scantool USA By CML USA
Schmolz + Bickenbach USA Inc
Scotchman Industries Inc
Semyx LLC
Sentry Insurance
Sertom Group North America LLC
Shop Data Systems Inc
Shoptech Software
Sigmatek Systems LLC
SNIPS Magazine
Society of Manufacturing Engineers

FORMING & FABRICATING

SpaceClaim Corp
Starrett Bytewise Measurement Systems
Steel Storage Systems Inc
SteelOrbis
Steinbichler Vision Systems Inc
Striker Systems
Tapeswitch Corp
Techni Waterjet
Techniks Inc
Temple Economic Development Corp
Tennessee Galvanizing Inc
The Fabricators & Manufacturers Association
TigerStop LLC
Timesavers Inc
Today's Indus Prds & Solutions
TOX Pressotechnik LLC
Travelers Companies Inc
Trilogy Machinery Inc
Trumpf Inc
Tsune America
UltraLube
Unipunch Products Inc
United Global Sourcing Inc
Unittool Punch & Die
Universal Drilling & Cutting Equipment
US Industrial Machinery Co
V&S Galvanizing LLC
Valmont Coatings
Verisurf Software Inc
Viking Blast & Wash Systems
Virtek Vision International
Voortman Corporation
VyTek Inc
Walker Magnetics
Water Jet Germany PVT Ltd
Weil Engineering North America
West Virginia Development Office
Wheelabrator Group
Whistler & Sons Inc, SB
Wila USA
Wilson Tool International
Wintriss Controls
Xinxiang Tianfeng Machinery Manufacture Co Ltd

METALFORM

Accurate Die Design Inc/ Logopress Corp
A-G Tool & Die
AIDA-America Corp
Alma Machinery Co
Almco Inc
AMETEK Specialty Metal Products for Fab
Anchor Danly
AP&T North America Inc
Applied Manufacturing Services LLC
ASSEMBLY Magazine
Associated Spring Raymond
Atlantic Tool & Die Co
Autoform Engineering
Automated Tapping Systems
Balluff Inc
Beckwood Press Co
Beijing Zhongjuhe Technology Development Co Ltd

METALFORM

BesTech Tool Corp
Bettcher Manufacturing Corp
Bilsing Automation North America
Bliss Clearing Niagara
Bohler Uddeholm Corp
Brown Boggs
Bruderer Machinery Inc
Chelar Tool & Die Inc
Chemtool Inc
CIECO Inc
Clips & Clamps Industries
COE Press Equipment
Creaform 3d
Dallas Industries Inc
Dayton Progress Corp
DELTA Computer Systems Inc
Demag Cranes and Components
Desch Canada Ltd
Diehl Steel Co
Dongsan Bearing Co
Durable Superior Casters
EAS Mold & Die Change Systems, Inc
Ehrhardt Tool & Machine
Elizabeth Carbide Components
Engineering Technology Associates Inc
Enprotech Industrial Technologies LLC
Erasteel Inc
Erickson Metals Corp
Etco Industrial Co Ltd
F & G Tool and Die Co
Fast Rite International
Feed Lease Corp
Fibro Inc
FloMet LLC
Forming Technologies Inc
Gerb Vibration Control Systems
Glenn Metalcraft Inc
Global Metal Spinning Solutions Inc
Grand Rapids Machine Repair
Greenerd Press & Machine Company Inc
Happy Feet
Hebei Shinning Metals Co Ltd
Heim Group, The
Hexagon Metrology Inc
Hilma Division Carr Lane Roemheld
Hiwin Corp
Houghton International Inc
Industrial Innovations Inc
Interlaken Technology Corp
International Chemical Co
IonBond
Iturrospe
Kent Corp
Komatsu America Industries LLC
Kosmek USA
Lapham-Hickey Steel Corp
Latrobe Specialty Steel Distribution
Linear Transfer
Automation Inc
Link Systems
Logopress Corp
LSP Industries Inc
Lucky Harvest Co Ltd
Macrodyne Technologies Inc
Mayfran International Inc

METALFORM

Metronor Inc
Minister Machine Co, The
MJC Engineering & Technology Inc
Moeller Precision Tool
Mohawk Machinery Inc
Multipress Inc
Nachi America Inc
NGK Metals Corp
Nikon Metrology Inc
Norwalk Innovation
Oak Press Solutions Inc
Orttech Inc
P&G Fluid Power Inc
Pacesetter Systems
Packsize LLC
Penn United Technology Inc
PennEngineering
Peterson Spring
Philpott Rubber/ Lankhorst Mouldings
Plex Systems
Pottiez America LP
Precision Metalforming Association
Precision Punch Corp
Precision Stamping Products
Precision Steel Warehouse Inc
Premier Tooling & Mfg Inc
Pronic Inc
Ready Technology Inc
Redifoils LLC
Rock Valley Oil & Chemical Co Inc
Rocklin Manufacturing Co
Roll Former Corp
Ross Controls
Samco Machinery Ltd
SB Specialty Metals
Schuler Incorporated
SelfLube
SEYI Presses
Shenzhen Huayuanda Technology Co Ltd
Shenzhen SYH Tooling Co Ltd
Shop Edge Software Inc
SKF USA Inc
Solar Atmospheres of California
Special Springs LLC North America
StampingSimulation.Com Pty Ltd
Stamtec Presses
Steel King Industries Inc
Stripmatic Products Inc
Studio Eleven/ Vivid Mfg Group
Superform USA
Superior Die Set Corp
TCT Stainless Steel Inc
Toledo Blank
Toledo Integrated Systems
TOP YES Precision Metal Products Co LTD
Tower Oil & Technology Co
Trans-Matic Mfg Co Inc
Triform
Turck Inc
Uelner Precision Tools & Dies
Ulbrich Stainless Steels & Special Metals Inc
Ultratech Tool & Design Inc
Unisorb Installation Technologies
Unist Inc
United Aluminum Corp
United Performance Metals

METALFORM

Versatility Tool Works & Mfg Co
Vibro Dynamics Corp
Vulcan Tool Corp
Wendt LLP
Wilco Inc
Wilson Tool International
Wysong Parts and Service
Zapp Precision Strip
Zerust Corrosion Solutions (Northern Tech Intl Corp)

TUBE/PIPE/WIRE

2020 Software Solutions Inc
Abbey International Ltd
Accurex Measurement Inc
Addison Machine Engineering Inc
AddisonMckee Inc
Advanced Tubular Technologies Inc
AIM Inc
Ajax Tocco Magnethermic
Alpine Bender Machinery
AltaMAR Inc
Ampco Metal Inc
BLM GROUP USA Corp
Bronx International Inc
Bronx Taylor-Wilson
Chiyoda Kogyo-Maruka USA
Cimcool Fluid Technology
Clark Fixture Technologies
Crippa SPA
D&H Machinery Inc
Eaton Leonard
Eddytech Systems Inc
EFD Induction Inc
Eldec Induction USA
Foerster Instruments Inc
Fontijne Grotnes Inc
Formdrill USA Inc
Fuchs Lubricants Co
Gem Tool Corporation
GH Induction Atmospheres LLC
Global Precision Parts Inc
Gorbel Inc
Guild International
H & S Tool Inc
Hess Industries Inc
Horn Machine Tools Inc
Houghton International Inc
J & S Machine Inc
Kent Corp
KoCos America LLC
Laboratory Testing Inc
Lillbacka Powerco USA Inc
Linemaster Switch Corp
Manchester Tool & Die Inc
Metalloid Corp
Metallurgical & Materials Technologies Inc
Midwest Bender Services Corp
Mill Masters
National Bronze & Metals Inc
New Form Tools Ltd
Nitto Kohki USA Inc
NKS
Nutek Green
Ohio Laser LLC
OMNI-X Inc
Overton Industries
Paramount Innovative Mfg

TUBE/PIPE/WIRE

Passline Performance
PHI
Pillar Induction
Pines Technology
Prestige Indus Pipework Eq
Production Tube Cutting Inc
Proto-1 Manufacturing
R&B Machining Inc
REA Elektronik Inc
Roll Machining Technologies & Solutions
Samuel Strapping Systems
SB Machine Tools
Simufact-Americas LLC
SPANCO Inc
T&H Lemont
TaurinGroup USA
T-DRILL Industries Inc
Thermatool Corp
Thermo Scientific Portable XRF Analyzers
Tools for Bending
Tube & Pipe Technology
Tube Bending Concepts Inc
Tube Works Inc
Tubex Technology Machinery Inc
Universal Controls Group
Universal Tool & Engineering
Universal Tube & Rollform Equipment Corp
VJ Technologies
WAFIOS Machinery Corp
Wauseon Machine & Manufacturing Inc
Winton Machine Co
Xiris Automation Inc

WELDING

3M
ABB Inc
ABICOR Binzel Corp
Ace Industrial Products
Airgas Inc
Ajan Elektronik Servis San Ve
Alabama Laser
Allcryo
ALM Corp
Alpha Professional Tools
America Fortune Company
American Society For Nondestructive Testing
American Technical Publishers
American Torch Tip Co Inc
American Welding Society
AMET Inc
Antec Electronics Co Ltd
Anthony Welded Products Inc
Aquasol Corp
Arc Machines Inc
Arc Products
Arc Specialties Inc
ARCON Welding Equipment LLC
ArcOne
ATI Industrial Automation
Ati Stellram
Auburn Manufacturing Inc
Avani Environmental Intl Inc.
AVANT GARDE TECHNOLOGIE INC
AVS Industries LLC

WELDING

AW&S Co Ltd
AWS Foundation
AWS Publications/World Engineering Xchange
Axelent Inc
B&B Steel Products Inc
Bad Dog Tools
Bay State Surface Technologies
Beijing Essen Welding & Cutting Fair
Bernard Welding Equipment
BESSEY Tools North America
Blackjack Pipejack Stands LLC
Bluco Corp
BMM Welding Material Co
Bohler Welding Group USA Inc
Bolttech Mannings
Bonal Technologies Inc
Bore Repair Systems Inc
Bosch Power Tool Corp
Bradford Derustit Corp
Broco Inc
Buffalo Shrink Wrap
Bug-O-Systems/ Cypress Welding
Burny & Kaliburn
C H Symington & Co Inc
Cambridge Vacuum Engineering
Cantesco (Kemper System America Inc)
Capital Weld Cleaners
Carestream
Carhartt Workwear
Carr Lane Manufacturing Co
CEIA USA
Cerbaco Ltd
CGW-Camel Grinding Wheels USA
Changzhou Golden Globe Welding & Cutting Equipment Co Ltd
Changzhou Huarui Welding & Cutting Equip Co Ltd
Changzhou Shine Science & Technology Co Ltd
Changzhou Wujin Golden Globe Welding & Cutting Machinery Co Ltd
Changzhou Zhengyang Welding Material Co Ltd
Chart Inc
CK Worldwide
Clara Vision
Climax Portable Machining & Welding Systems
Cloos Robotic Welding Inc
CM Industries Inc
COB Industries Inc
Compressed Air
Computer Engineering Inc
Computers Unlimited
Corewire Ltd
COR-MET INC
CS Unitec Inc
C-spec
Cyl-Tec Inc
D/F Machine Specialties Inc
Dakota Ultrasonics
Dataweld Inc
Daymark Technologies
Dengensha America Corp
DE-STA-CO
Diagraph MSP an ITW Company
Diamond Ground Products Inc
Dinse Inc
Direct Wire & Cable
Diversi-Tech Inc
Donaldson Torit - Donaldson Company Inc
Dr Gold & Co
DualDraw LLC
DURUM USA
Dynatorch Inc
Easy Abrasives LLC
EH Wachs Co
ELCo Enterprises
Elcometer Inc
Electron Beam Engineering Inc
Electron Beam Technologies Inc
Element Materials Technology
Environmental Air Solutions
Equipois Inc
ESAB Welding & Cutting Products
Essen Trade Shows
Etal/INDUX Sa De Cv
Factory Cat
FANUC Robotics America Inc
Fastenal Company
Fein Power Tools Inc
Fibre-Metal By Honeywell
Flame Technologies Inc
Folding Guard Corp
Forster Welding Systems GmbH
Frommelt Safety Products
Fronius USA LLC
Fusion Inc
G&J Hall Tools Inc
Gaozhou City Longsafety Labor Insurance
Gasflux Co
gasgrab.com
GE Measurement & Control Solutions
General Tool
Genesis Systems Group
Genstar Technologies Inc
Global Hardgoods
Goff's Enterprises Inc
Golden Eagle Minmetals(Beijing) Wldg Materials Co
Goldland Industrial Co Ltd
Goss Inc
Gullco International
H & M Pipe Beveling Machine Co Inc
HAI Advanced Material Spec
Harbert's Products Inc/ Allied Flux Reclaiming Ltd
Harper Trucks Inc
Harris Products Group
Haynes International
Hermes Abrasives Ltd
HIT Tools USA
Hobart Brothers
Hobart Institute of Welding Technology
HOT COILS
Hypertherm Inc
Hyundai Welding Products
IBEDA /Superflash Compressed Gas Equipment Inc
Ideal Welding Systems LP
igm Robotic Systems Inc/Astro Arc Polysoude/ PTR-Precision Technologies Inc
IMPACT Engineering Inc
Industrial Air Solutions Inc/Coral Spa
Industrial Maid
Innerspec Technologies
Interactive Safety Product Inc
Intercon Enterprises Inc
International Welding Technologies Inc
InterTest Inc
IPG Photonics
Ironworkers Management Progressive Action Cooperative Trust (IMPACT)
Janda Co Inc
JASIC Technology Co Ltd
JAZ USA Inc
Jetline Engineering
Jiangsu Xinhua Electric Alloy Co Ltd
Jingyu Welding & Cutting Co Ltd
Jinhua Bieduo Import & Export Co Ltd
JLC Electromet Pvt LLC
John Tillman Co
Joysun Abrasives Co Ltd
JP Nissen Co
Kalas Wire Inc
Kemper America Inc
Kennametal Stellite
Kimberly-Clark Professional
Klimawent USA LLC
KLINGSPOR Abrasives Inc
Kobelco Welding of America Inc
Koike Aronson Inc
Koyo Giken Inc
KUKA Robotics Corporation
KULLEN - KOTI Gmbh
LA-CO Industries/Markal
Lapco Mfg Inc
Laserage Technology Corp
Liburdi Dimetrics Corporation
Lincoln Electric Co
LONGEVITY Welding & Cutting Products
LORD Corp
Lucas-Milhaupt Inc
MAGMAWELD
Magnatech LLC
Manufacturing Solutions Inc
Massaging Insoles By the Master's Plan
Matheson
Mathey Dearman
Matuschek Welding Products Inc
Medi Mall Inc
Meltric Corp
Melttools LLC
Mercer Abrasives
Meta Vision Systems Inc
Metabo Corp
Metal Man Work Gear Co
Metallizing Equipment Co PVT LTD
Michigan Pneumatic Tool Inc
Micro Air
Micro Arc Welding Inc
Midalloy
Miller Electric Mfg Co
Miller Welding Automation
MK Products Inc
MMC Superalloy Corp
Module-Air LLC
Motoman Robotics Division
MPT Industries
MTA-USA LLC
Multiplaz
Multiquip Inc
Nachi Robotic Systems Inc
Nanjing Youtian Metal Technology Co Ltd
NASA
Nation Coating Systems Inc
Nation Wide Products
National Standard LLC
Nederman Inc
Nelson Stud Welding
NetBraze LLC
Nevatia Steel & Alloys Pvt LTD
New Fire Co Ltd
Newland (Tianjin) Welding Wire and Metal Products Co Ltd
Ningbo Jinfeng Welding & Cutting Machinery Manufacture Co Ltd
Ningbo Powerway Alloy Material Co Ltd
Nordfab Ducting
North (Nanjing) Instrument Technology Industries Group
Norton Abrasives
NSRW
Ogden Welding Systems
OKI Bering
Olympus
OPTREL AG
Osborn
OTC DAIHEN Inc
Oxylance Inc
Pacific Aerospace & Electronics
Pador Marketing Group
Pan Taiwan Enterprise
Pandjiris Inc
Parker domnick hunter
PDS Bartech Inc
Pearl Abrasive Co
Permadur Industries Inc
PFERD INC
Phoenix International Inc
Polymet Corp
Praxair Inc
Prazi USA
Precitec Inc
Preston-Eastin Inc
Principal Manufacturing Corp
PROFAX / LENCO
Profiler Inc
Pro-Fusion Technologies
PTR-Precision Technologies Inc
Pushcorp Inc
Pyro Shield Inc
Radyne Corp
Ratermann Mfg Inc
Red Rock Automation/ Romar/MEC
Reis Robotics USA Inc
Revco Industries Inc
Rex-Cut Abrasives
Rhino Cutting Systems
Richard Wolf Industrial
Rimco Equipment
Robotiq
Robotmaster-In-House Solutions Inc.
Rolled Alloys
RoMan Mfg Inc
Rose Plastic USA LP
Saar Hartmetall USA LLC
Saf-T-Cart Inc
Sakura of America
Sandvik Materials Technology
Sanpo Publications Inc
Saru Silver Alloy Private Limited
Save Phace Inc
Schaefer Ventilation
Schreiber Chillers
Secoa Technology
Sellstrom Manufacturing Co
Servo-Robot Inc
Shanghai Gonglue Machinery & Elect Tech Co Ltd
Shanghai Top Bridge Industry Co Ltd
Shantou Inst of Ultrasonic Instruments Co Ltd (SIUI)
Sherwin Inc
sia Abrasives Inc
SKM Industries Inc
Smith Equipment
Southern Copper & Supply
Southern Stud Weld Inc
Southern Welding Systems Intl
Special Metals Welding Products Co
St Louis Metallizing Co
State of Wyoming
Staubli Corp Multi Contact USA
Steelmax Tools
SteelTailor Ltd
Steiner Industries
Strong Hand Tools
Strong Hold Products
Suhner Industrial Products Inc
Sulzer Metco US Inc
Sumner Manufacturing Co Inc
Sunstone Engineering
Suntex Composite Industrial Co Ltd
Superior Abrasives Inc
Superior Products
Swagelok Marketing Services Co
TAFA Inc
TDC Filter Inc
Team Industries Inc
TEC Torch Co Inc
Techflex Inc
Technical Translation Services
Technogenia Inc
TECMEN Electronics Co Ltd
Tempil an ITW Company
Termmei Torch & Tip Company
Thermacut Inc
ThyssenKrupp VDM USA, LLC
Tianjin Jinlong Welding Material Co Ltd
Tianjin Minmetals NC Co Ltd
Tianjin Xinsen Welding Materials Co Ltd
Titus Flux Inc/American Welding & Flux
TJ Snow Co
Trafimet USA
Tregaskiss
Trendex Information Systems Inc
Tri Tool Inc
Tri-Mer Corp
Triple Crown Products
Tru-Weld/Stud Welding Products
Trystar
Tulsa Welding School
U.S. Invitational Weld Trials
U-Mark Inc
United Abrasives Inc /SAIT
Uniweld Products Inc
Vernon Tool / Torchmate
Vicon - Plasma Automation Inc
Victor Technologies Intl Inc
Victory Plasma Systems Inc
VSM Abrasives
Walter Surface Technologies
Washington Alloy Co
Watts Specialties Inc
Wayne Trail A Lincoln Electric Co
Weiler Corp
Weld Engineering Co
Weld.com
Weld-Aid Products
Weldas Co
Weldcoa
Weldcraft
Welding Alloys USA
Weldlogic Inc
Weldsale LLC
Weldship Corp
Wendt USA LLC
Wenling Wanshun Electromechanics Manufacture Co
Wenzhou Xidin Electronics Technology Co Ltd
West Chester Holding Inc
Western Enterprises
White Engineering Surface Corp
Wilton Tools
Winnox Industries Ltd
Wirecrafters
Wireway Husky Corp
Witt Gas Controls
Wolf Robotics LLC
Wolverine Joining Technologies
Wuhan Welhel Photoelectric Co Ltd
Wuxi Ronniewell Machinery
Wuxi Volcano Welding & Cutting
Yaskawa America Inc
York Portable Machine Tools
Yunnan Hengyu Optical Electronics Co (Optech Co)
Zhejiang Changzheng Project Carbon Electrodes Co Ltd
Zhejiang Yuguang Aluminium Material Co Ltd
Zhengzhou Anxin Abrasives
ZJ Industries Inc

SPECIAL EVENTS

SUNDAY, NOVEMBER 11, 1:00 p.m. – 5:00 p.m.

F01: WORKSHOP: LEAN MANUFACTURING FOR MANAGERS

Location: Room N116 **Limited to 24 participants**

Member: $275, Non-member: $295

In today's business environment, where global competition and constant price reduction demands from customers impact heavily on management decisions, lean manufacturing concepts have helped companies to remain competitive, innovative and profitable. Lean implementation results in enhanced cost and cycle-time reduction, customer satisfaction and standardized high quality. This session will give an overview on lean methods that can be used to minimize all forms of waste and maximize value for the customer.

- Introduction to Lean
- The Eight Wastes of Lean
- The Building Blocks of Lean
- A hands-on class exercise building paper airplanes in a mass production method and then in a Lean environment

Instructor:
Anthony Manos, Catalyst, Profero, Inc.

NEED MORE LEAN TRAINING? Check out the complete LEAN TRACK on pages 26-27 for additional educational sessions.

MONDAY, NOVEMBER 12, 12:30 p.m.-1:45 p.m.

E1: STATE OF THE INDUSTRY: MANUFACTURERS' EXECUTIVE OUTLOOK

Location: North FABTECH Theater **Free and open to all attendees**

How are businesses that attend FABTECH dealing with change in today's manufacturing environment? Hear insights from leaders representing job-shops, contract manufacturers and other service providers who are dealing with the same issues of supply, demand, labor and changing business sectors that affect your survival in today's economy. Join the interactive Q & A led by Chris Kuehl, FMA Economist to ask questions and offer your perspective on the future of the industry. Return to your company with new insights that will guide your decision-making in 2013.

Panelists:

Rick Taylor
President and CEO
Jay Industries Inc.

Gregg Simpson
President and Owner
Ohio Laser LLC

Patrick J. Thompson (PJ)
President
Trans-Matic Manufacturing Co.

Jerry B. Ward
Vice President
Metcam Inc.

Shivie Dhillon
Owner and President
SunDial Powder Coatings

Moderator:
Chris Kuehl
Economic Analyst for FMA,
Managing Director, Armada Corporate Intelligence

TUESDAY, NOVEMBER 13, 12:30 p.m. – 1:30 p.m.

E3: POST-ELECTION ANALYSIS: HOW THE RESULTS IMPACT U.S. MANUFACTURING

Location: North FABTECH Theater **Free and open to all attendees**

The inauguration of the President and changes in Congress after the November general election will have a profound impact on U.S. businesses. This panel discussion will offer an in-depth analysis of the election outcome. Panelists will share their insight, as well as answer questions, on how the results will affect environmental regulation, tax policy, labor law, fair trade agreements, defense spending, energy policy, and other key issues that could impact U.S. manufacturing and your business in the years to come.

Panelists:

Omar S. Nashashibi
Partner
The Franklin Partnership, LLP

Stephen Barlas
Author of "Around Washington" for *The FABRICATOR®*

David Goch
Partner
Webster, Chamberlain & Bean

Moderator:
Paul Nathanson
Founding Partner
Policy Resolution Group

NEW PRODUCT PRESENTATIONS

Location: FABTECH THEATER, North and Central Halls **Free and open to all attendees**

Sit in on brief exhibitor-led sessions of the best new products and technologies to hit the market at the FABTECH Theater. With dozens of companies making presentations in two theaters located on the exhibit floor, this is a great opportunity to stay on the leading edge. A daily schedule of presentations will be available at **fabtechexpo.com/specialevents** by September 1.

AWS SKILLS COMPETITION

Location: Show Floor, North Hall

The U.S. Invitational Weld Trials is a part of our selection process to choose our TeamUSA Welding competitor for the 42nd World Skills Competition — Leipzig, Germany in July of 2013. We will have six of our top USA finalists competing for the top three positions as we continue our selection process after the U.S. Open Weld Trials. We will be awarding medals to all of the top finishers as six additional international teams have been invited to join us. Certainly only the highest three U.S. competitors will be eligible to become the TeamUSA welder, but the international competitors will be eligible to receive medals from the U.S. Open Weld Trials. Come see the future global welding workforce in action all week. The winners will be announced at a private reception but notice will be found in the *Welding Journal.*

NETWORKING EVENTS

MONDAY, NOVEMBER 12

E2: COCKTAILS AND COMEDY

Location: Room N109/110

Doors open: 5:30 p.m.
Show: 6:15 p.m. – 7:00 p.m.

Bring on the fun! Connect with new friends and old and celebrate the close of opening day "Vegas-style" at the FABTECH Cocktails and Comedy event. Kick back , relax and enjoy a night of laughs with comedian Greg Hahn. Greg has appeared on Late Night with Conan Obrien, Comedy Central, ABC, CBS and FOX . His lively interactive performance will make you laugh until you cry. You won't want to miss it! Complimentary admission and beverage ticket with event registration.

TUESDAY, NOVEMBER 13

HAPPY HOUR

Location: North and Central Halls

3:00 p.m. – 5:00 p.m.

Mix and mingle with other attendees and exhibitors during Happy Hour beginning at 3:00 p.m. on Tuesday, November 13. Held on the exhibit hall floor, Happy Hour is a great way to network with peers in a relaxed, entertaining environment while perusing the technology in exhibitor booths. Enjoy a drink on us with your complimentary beverage ticket.

FABTECH BISTRO

Location: North and Central Halls

Reserve a table at the new **FABTECH Bistro** and you will always have a convenient place to eat, meet and network. With two locations on the show floor, the Bistro offers assorted menu options including fresh and healthy lunch options, international cuisine and regional favorites – all at a reasonable price. Pre-purchase your individual lunch tickets to avoid the lines, or purchase a table to hold small meetings, informal lunches or roundtable discussions throughout the day. Find the daily menu, pricing and order tickets at **fabtechbistro.com.**

ABOUT THE EDUCATION PROGRAM

The Fabricators & Manufacturers Association, Int'l (FMA), Society of Manufacturing Engineers (SME), Precision Metalforming Association (PMA), and Chemical Coaters Association International (CCAI), co-sponsor the sessions on cutting, finishing, forming & fabricating, lean, management, stamping, and tube & pipe. All sessions are two hours in length, offering practical knowledge you can use right away. Sessions with Tech Tours combine classroom instruction followed by expert-led guided tours on the show floor to see technology operating in designated booths.

MEMBERSHIP INFORMATION

Discounted rates for members available on educational programs. Interested in becoming a member of FMA, SME, AWS, PMA or CCAI? Find details on each of the co-sponsor associations and membership benefits by visiting their Web site today!

aws.org fmanet.org sme.org

pma.org ccaiweb.com

The American Welding Society (AWS) presents a comprehensive lineup of welding education. Led by the industry's top professionals, programs focus on best practices and new commercial developments in welding and thermal spray. Events include conferences, seminars, RWMA Resistance Welding School, professional program, society events, & more.

CONTINUING EDUCATION CREDITS

Individuals who attend AWS education programs are awarded 1 PDH (Professional Development Hour) for each hour of education program attendance. Individuals seeking FMA Recertification Credits will be awarded 2 credits for each conference session attended (forming & fabricating, cutting, or finishing tracks) plus an additional 2 credits for attending the show. Individuals who attend SME education programs may be eligible to receive one credit per hour attended toward their SME-managed recertification requirements.

EXPERIENCE LEVELS

Use this key to find the education that meets your needs.

- B **Basic** – Recommended for the attendee who is new to the industry or needs a refresher on the topic.
- I **Intermediate** – Designed for the attendee who already has a basic understanding of the subject matter.
- A **Advanced** – For the attendee with several years of experience who is seeking more in-depth information.

PRICING INFORMATION

Cutting, Finishing, Forming & Fabricating, Lean, Management, Stamping, Tube & Pipe, and Finishing Education		
	Member	Non-Member*
1 Session	$150	$175
2 Sessions	$280	$325
3 Sessions	$375	$445*
4 Sessions	$475	$545*
Full Conference (5 or more sessions) Includes (1) $20 lunch ticket	$680	$780*

Rates good through Sept. 28. After this date, please add $25.

*Non-member rates for 3 or more sessions include a one-year complimentary membership to one of the co-sponsoring associations (FMA, SME, PMA, CCAI).

Welding Education		
	Member	Non-Member[a]
1-Day AWS Educational Sessions[b]	$150	$225
3-Day AWS Educational Sessions[b]	$225	$360
1/2-Day Seminar	$150	$285
1-Day Conference or Seminar	$345	$480
2-Day Seminar	$550	$685
2-Day RWMA Resistance Welding School	$475	$695
1-Day Professional Program	$150	$285
3-Day Professional Program	$225	$360
Student Professional Program	$75	$90[c]
AWS Awards Luncheon	$30	$30

[a] Non-member price for AWS Sessions only includes a two-year AWS Individual Membership.

[b] This year, the Education Annual Program and the National Welding Education Conference (Weld-Ed) have teamed together to provide the new program titled AWS Educational Sessions. Non-member AWS Educational Sessions price includes a one-year AWS Membership.

[c] Non-member Student Professional Program price includes a one-year AWS Student Membership.

CANCELLATION POLICY: Cancellations must be made in writing and faxed to Attn: FABTECH Conference Cancellation at (313) 425-3407 no later than October 26, 2012 to receive a full refund minus a $50 administrative fee. Cancellations received after this date are non-refundable.

MONDAY, NOVEMBER 12

TECHNOLOGY	8:00 a.m. – 10:00 a.m.	10:30 a.m. – 12:30 p.m.	1:30 p.m. – 3:30 p.m.
CUTTING	F10: NEW! Overview of Laser Technology and Systems I	F20: NEW! Innovations and Considerations for Fiber or CO_2 Laser Technology A	F30: Advancements in Fiber Laser I
FINISHING	C10: NEW! Building Blocks of a Powder Coating System B	C20: NEW! Autodeposition & Powder Coating Hand-in-Hand I	C30: Powder Coating Conversion & Case Studies I
	C11: NEW! Running Efficient Liquid Systems A	C21: NEW! When to Use a Custom Coater B	C31: NEW! Finishing Essentials: Conveyors, Racking & Testing B
FORMING & FABRICATING	F11: Roll Forming Fundamentals B	F21: General to Advanced Roll Forming Concepts A	F31: What's New in Press Brakes with Tech Tour I
	F12: NEW! Designing Parts for Sheet Metal A		F32: Estimating: Made to Order I
LEAN	F13: Low-Volume, High-Variety — No Problem for Lean I	F22: NEW! Profit Destroyers: Finding and Fixing Them A	F33: Introduction to 5S and the Visual Workplace I
MANAGEMENT	F14: NEW! Safety and Productivity for a Responsible Partnership I	F23: Driving High Performance Through Employee Engagement I	F34: NEW! Survival and Success Through Shared Lean Vision I
	F15: Social Marketing on Speed — Crash Course I	F24: NEW! Online Marketing for Manufacturers: Growing Your Business Using the Web B	F35: NEW! Let's All Play Nicely Together: Managing Boomers, Xers and Yers in Your Business A
STAMPING	S10: New Tool Steels to Improve Die Life I	S20: Introduction to Formability Engineering and Analysis B	S30: Progressive Strip Layout and Stamping Estimating B
	S11: NEW! Improving Business Results Through Effective Cost Models and Training I	S21: NEW! Case Studies — In-Die Sensor Applications and Growing Talent Through Internships I	S31: NEW! Effective C.I., Safety and World Class Idea Cultures I
TUBE & PIPE	F16: NEW! Advancements in Welded Tube Production I	F25: NEW! Principles of Tube Fabrication B	F36: NEW! Lean and Green Tube Bending I

WELDING

SEMINARS

W10: Metallurgy Applied to Everyday Welding . . . . . 8:30 a.m. – 4:30 p.m.
W11: Advanced Visual Inspection Workshop. . . . . 8:30 a.m. – 4:30 p.m.
W12: API 1104 Code Clinic (Spanish) . . . . . 1:00 p.m. – 5:00 p.m.
W15: ASME Section IX, B31.1 & B31.3 Code Clinic - Day 1. . . . . 8:30 a.m. – 4:30 p.m.

CONFERENCES

W26: Underwater Welding and Cutting . . . . . 9:00 a.m. – 3:30 p.m.
W30: Thermal Spray Basics: Putting Coatings to Work – FREE . . . . . 1:00 p.m. – 4:00 p.m.

PROFESSIONAL PROGRAM

W32: Session 1: Industry/University Collaborative Research Center on Integrated Materials Joining Science for Energy Applications – Welding Metallurgy . . . . . 1:30 p.m. – 5:30 p.m.
Session 2: Arc Welding Studies . . . . . 1:30 p.m. – 5:30 p.m.
Session 3: Weld Microstructure and Properties . . . . . 1:30 p.m. – 5:30 p.m.

EDUCATIONAL SESSIONS

W37: AWS Educational Sessions. . . . . 8:00 a.m. – 5:00 p.m.

SPECIAL PROGRAMS

AWS Skills Competition - Day 1. . . . . 9:00 a.m. – 6:00 p.m.
W42: AWS Education Program Q & A – FREE . . . . . 2:00 p.m. – 3:00 p.m.
W43: Brazing Symposium – FREE . . . . . 2:00 p.m. – 5:00 p.m.

B = Basic I = Intermediate A = Advanced

SCHEDULE-AT-A-GLANCE

TUESDAY, NOVEMBER 13

TECHNOLOGY	8:00 a.m. – 10:00 a.m.	10:30 a.m. – 12:30 p.m.	1:30 p.m. – 3:30 p.m.
CUTTING	F40: Comparative Cutting with Tech Tour B	F50: Advancements in Waterjet Cutting I	F60: Advancements in Plasma Cutting I
FINISHING	C40: Conceptos Básicos de Pintura en Polvo en Español B	C50: Efficient Parts Curing with Infrared Technology B	C60: NEW! Trends in Powder Coating Application Equipment A
	C41: NEW! Finishing Essentials: The Importance of Cleaning Prior to Pretreatment I	C51: NEW! A World of Their Own: What's Trending in Coatings A	C61: Protecting Your Finishing Operation B
	C42: NEW! Paint Line Efficiencies and Energy Savings A	C52: NEW! How World-Class Coaters Use Kaizen to Optimize Finishing Line Productivity I	C62: NEW! Innovations in Pretreatment A
FORMING & FABRICATING	F41: NEW! Tooling Solutions for Metal Fabrication B	F51: Effectively Slitting and Blanking Coils I	F61: NEW! How Flat is Your Material? Advancements in Leveling Technology A
	F42: Automated Deburring: A Surprising Cost and Time Saving with Tech Tour B	F52: NEW! Plate Fabrication I	F62: NEW! Using Robotics in Metal Forming and Fabrication I
LEAN	F43: NEW! Introduction to Value Stream Mapping A	F53: NEW! Facility Design and Layout for Lean Manufacturing I	F63: NEW! Quick Changeover Techniques to Reduce Set-up Time A
MANAGEMENT	F44: A Practical Approach to Developing a Strategic Plan for the Job Shop I	F54: NEW! Merger, Acquisition and Capital Review - Preparing Your Company for a Liquidity Event A	F64: NEW! Catapult The Cow — Case Studies in Lean Manufacturing I
	F45: NEW! Developing a Winning Sales Force I	F55: NEW! Strategies to Help Custom Manufacturers Increase Sales and Leads I	F65: NEW! Manufacturing Metrics: Training to Drive Sustainable Business Processes A
STAMPING	S40: NEW! Advances in Stamping Technology: Servo Drives and In-Die Fastening I	S50: NEW! Enhancing Quality Through Efficient Hole Punching and Springback Control I	S60: Stamping High Strength Steel in Progressive Dies I
TUBE & PIPE	F46: NEW! Reducing Scrap on Tube and Pipe Mills I	F56: NEW! Tube Mill Coolants and Testing A	F66: NEW! Best Practices in Hydroforming B

WELDING

SEMINARS

W13: D1.1 – Code Clinic (Spanish) . . . . . 8:30 a.m. – 4:30 p.m.
W15: ASME Section IX, B31.1 & B31.3 Code Clinic - Day 2 . . . . . 8:30 a.m. – 4:30 p.m.
W16: The Why and How of Welding Procedure Specifications B . . . . . 8:30 a.m. – 12:00 p.m.
W17: The Why and How of Welding Procedure Specifications A. . . . . 1:00 p.m. – 5:00 p.m.
W18: The Why and How of Welding Procedure Specifications (Full Day) B A. . 8:30 a.m. – 5:00 p.m.
W19: Understanding Welding Symbols B . . . . . 8:30 a.m. – 12:00 p.m.
W20: Understanding Welding Symbols A . . . . . 1:00 p.m. – 5:00 p.m.
W21: Understanding Welding Symbols (Full Day) B A . . . . . 8:30 a.m. – 5:00 p.m.
W22: Welding of Stainless Steel B . . . . . 8:30 a.m. – 4:30 p.m.

CONFERENCES

W27: Health and Safety in the Welding Environment . . . . . 9:00 a.m. – 4:00 p.m.
W29: Thermal Spray Technology: High-Performance Surfaces. . . . . 9:00 a.m. – 5:00 p.m.

RWMA SCHOOL

W31: RWMA Resistance Welding School - Day 1 . . . . . 7:45 a.m. – 5:30 p.m.

PROFESSIONAL PROGRAM

W33: Session 4: Keynote Address: Dr. Peter Mayr . . . . . 8:00 a.m. – 9:00 a.m.
Session 5: Industry/University Collaborative Research Center on Integrated Materials Joining Science for Energy Applications – Modeling . . . 9:00 a.m. – 12:00 p.m.
Session 6: Friction Stir Welding & Solid State Processes . . . . . 9:00 a.m. – 12:00 p.m.
Session 7: Welding Metallurgy . . . . . 9:00 a.m. – 12:00 p.m.
Session 8: Sensing Applications . . . . . 2:00 p.m. – 5:00 p.m.
Session 9: Industry/University Collaborative Research Center on Integrated Materials Joining Science for Energy Applications – Weldability . . . . . 2:00 p.m. – 5:30 p.m.
Session 10: Applied Technology. . . . . 2:00 p.m. – 5:30 p.m.

EDUCATIONAL SESSIONS

W38: AWS Educational Sessions (including Plummer Lecture) . . . . . 8:00 a.m. – 5:00 p.m.

SPECIAL PROGRAMS

AWS Skills Competition - Day 2. . . . . 9:00 a.m. – 5:00 p.m.
W41: AWS Awards Luncheon . . . . . 12:00 p.m. – 2:00 p.m.

B = Basic I = Intermediate A = Advanced

WEDNESDAY, NOVEMBER 14

TECHNOLOGY	8:00 a.m. – 10:00 a.m.	10:30 a.m. – 12:30 p.m.
CUTTING	F70: NEW! Industrial Applications in Laser I	
FINISHING	C70: NEW! Manual Powder Coating: The Basics B	C80: NEW! Cost Saving Measures for Powder Coating A
	C71: Advances in Porcelain Enamel B	C81: Introduction to Electrocoating B
FORMING & FABRICATING	F71: NEW! Maximizing Your Press Brake A	
LEAN	F72: NEW! Introduction to Total Productive Maintenance I	F80: NEW! The Six Sigma Problem Solving Strategy in a "Nutshell" A
MANAGEMENT	F73: Implementing Lean Manufacturing in a High Mix – Low Volume Shop I	F81: NEW! Backshoring/Reshoring: A Manufacturing Opportunity B
	F74: NEW! Leadership: Supporting Growth and Profitability A	
STAMPING	S70: NEW! Improving Stamping Efficiencies Through Measuring and Right Sizing Equipment I	S80: NEW! Stamping Press Maintenance – Preventive and Planned Obsolescence I

WELDING		
SEMINARS	W14: D1.5 - Bridge Code Clinic	8:30 a.m. – 12:00 p.m.
	W23: Welding of Stainless Steel (Avoiding Weld Defects) I	8:30 a.m. – 4:30 p.m.
	W25: Corrosion of Welds: Causes and Cures	8:30 a.m. – 3:00 p.m.
CONFERENCES	W28: Trends in Nondestructive Examination	9:00 a.m. – 3:30 p.m.
RWMA SCHOOL	W31: RWMA Resistance Welding School - Day 2	8:00 a.m. – 3:45 p.m.
PROFESSIONAL PROGRAM	W34: Session 11: Keynote Address: Prof. Philip Withers	8:00 a.m. – 9:00 a.m.
	Session 12: Applications of Weld Modeling	9:00 a.m. – 12:30 p.m.
	Session 13: Weldability	9:00 a.m. – 12:30 p.m.
EDUCATIONAL SESSIONS	W39: AWS Educational Sessions	8:00 a.m. – 12:00 p.m.
SPECIAL PROGRAMS	AWS Skills Competition - Day 3	9:00 a.m. – 4:00 p.m.
	AWS Certification Exam (advance application required)	7:00 a.m. – 6:00 p.m.

Questions regarding the educational programs at FABTECH can be directed to the following representatives:

WELDING
Contact AWS,
Martica Ventura
mventura@aws.org
800-443-9353

FORMING & FABRICATING, MANAGEMENT, TUBE & PIPE
Contact FMA,
Julie Maddock
juliem@fmanet.org
888-394-4362

STAMPING
Contact PMA,
Marianne Sichi
msichi@pma.org 216-901-8800

CUTTING, FORMING & FABRICATING, LEAN, MANAGEMENT
Contact SME,
Ila Lee
ilee@sme.org
800-733-4763

COATING, FINISHING
Contact CCAI,
Anne Goyer
anne@goyermgt.com
859-356-1030

SCAN THIS QR CODE WITH YOUR MOBILE DEVICE TO **REGISTER TODAY!**

B = Basic I = Intermediate A = Advanced

CUTTING TRACK

CUTTING TRACK

MONDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

NEW! F10: OVERVIEW OF LASER TECHNOLOGY & SYSTEMS I

Fiber Laser – Advancements in 1 Micrometer Laser Technology

This presentation will compare a fiber laser and CO_2 laser so you can decide which system is best for your company based on your application and the types of materials you want to process. Explore the technology advancements of the 1 micrometer fiber laser. Important characteristics of fiber laser technology will be evaluated, including cutting speeds, operating costs, processing efficiency, and maintenance requirements and costs.

Stefan Colle, LVD Strippit

Introduction and Advances in Laser Cutting – CO_2 to Fiber Delivered

This session will help you master the fundamentals of laser cutting. Learn how different laser resonators work, how the beam is delivered through the work piece, and additional machine features available, so you can select the best laser cutting technology for your system.

Rick Neff, Cincinnati Inc.

The Intelligent Machine: Innovations in Laser Cutting Technology

Laser cutting machines offer a continually increasing number of new techniques and options, many of which take over tasks previously performed by the machine operator. The result is increased reliability, productivity and safety. Combined with advancements in automation, these intelligent machines offer fabricators a wealth of possibilities.

Stefan Fickenscher, TRUMPF, Inc.

10:30 a.m. – 12:30 p.m.

NEW! F20: INNOVATIONS & CONSIDERATIONS FOR FIBER OR CO_2 LASER TECHNOLOGY A

High Speed Lasers and Down Stream Process Considerations

Fiber lasers and improvements in CO_2 technology have placed a strain on material handling and bending operations. Balanced throughput is needed in order to smoothly move product through a facility and reduce cost. Learn how today's lasers include great setup reduction features, while the material handling and automated bending options have also improved to help improve flow and reduce overall process time, part cost, and quality.

Jason Hillenbrand, Amada America, Inc.

When to Choose CO_2 or Fiber Laser Cutting Technology

This presentation will compare the fundamental differences between CO_2 and fiber laser technologies. How does each laser type generate their beam? What are the strengths of using CO_2 technology in cutting applications compared to using fiber technology? What are the differences in cost of operations and the effects on cost per part?

Frank Arteaga, Bystronic Inc.

1:30 p.m. – 3:30 p.m.

NEW! F30: ADVANCEMENTS IN FIBER LASER I

The Application of Cutting Small, Medium, and Large Profiles in Fiber Laser Cutting

When cutting with lasers, different size profiles may require multiple process parameters to be adjusted in real time to optimize cutting outcomes. Learn how the numerous process parameters have an impact in fiber laser cutting and what tools are available to assist them in automatically optimizing the cutting outcome.

Tate Picard and Douglas Shuda, Hypertherm Corp.

Beam Delivery Solutions for Fiber Lasers

Principles of laser beam delivery and optics will be reviewed and explained with an emphasis on the unique challenges of fiber lasers. Applications and beam delivery solutions will be presented highlighting the growing acceptance and utilization of fiber lasers in industrial processes.

Mike DelBusso, Laser Mechanisms, Inc.

Advancements in High Power Fiber Laser Technology and Applications

Mike Klos, IPG Photonics – Midwest Operations

Advanced Applications of Multi-Axis Solid-State Laser Systems

Learn about multi-axis laser cutting, welding, and laser metal deposition applications in a variety of industries. Case studies, cost and part quality considerations will be discussed.

Frank Geyer, TRUMPF, Inc.

B = Basic I = Intermediate A = Advanced

TUESDAY, NOVEMBER 13

8:00 a.m. – 10:00 a.m.

F40: COMPARATIVE CUTTING WITH TECH TOUR B

Laser Cutting
Review the basic capabilities and limitations of a laser and how it compares to other options on the market. Learn how a laser works and the different types of laser systems so you can pick the system that is right for you.
Mike Pellecchia, Mitsubishi/MC Machinery Systems Inc.

Waterjet Cutting
Learn about the very latest in waterjet technology, applying waterjet technology to new applications and how to get the most out of your waterjet. The future of waterjet technology will be discussed.
Tim Fabian, Flow International

Plasma Cutting
Discover how new advancements in plasma plate cutting technology have increased pierce thickness, allowing plasma to replace oxy-fuel in materials to 2" with faster speeds, lower costs, and often better cut quality. Recent improvements that make it possible to "plasma" drill holes in plate to 1" thick with no secondary operations required will also be reviewed.
Jim Colt, Hypertherm, Inc.

10:30 a.m. – 12:30 p.m.

F50: ADVANCEMENTS IN WATERJET CUTTING I

Retrofitting AWJ Waterjet Cutting Systems for Flexibility
Standardized abrasive waterjet (AWJ) cutting systems have limited capabilities. Learn how these systems can be retrofitted with a range of accessories such as rotary axes, angled cutting heads, special nozzles, vertical contour following systems and precision locators that can expand system capabilities for increased flexibility and profitability.
Laird Parry, OMAX Corp.

Increasing Waterjet Productivity with X-Stream Pressure Technology
90KSI+ X-Stream pressure waterjet technology has revolutionized the waterjet cutting industry by increasing productivity up to 50% and reducing operating costs as much as 40%. Is X-Stream pressure right for your shop? Learn about the technology behind X-Stream pressure and gain insights from case studies that demonstrate its benefits.
Jeff Schibley, Jet Edge, Inc.

1:30 p.m. – 3:30 p.m.

F60: ADVANCEMENTS IN PLASMA CUTTING I

Automated Plasma Bevel Cutting Technology: Process Challenges and How to Achieve Successful Outcomes
Many techniques are used to achieve beveled edges with systems ranging from simple grinding operations to cutting systems with articulating bevel heads to move the plasma torch. This session will describe the challenges then explore existing methods and advancements in the technology that improve the process to achieve the desired results.
Bob Boyes and Derek Weston, Hypertherm, Inc.

Unlocking the Secret to Plasma Plate Productivity
Learn how to move beyond simply making parts with plasma and begin utilizing all the technology has to offer, including the economics of material handling and by reducing scrap through effective part testing.
Lyle Menke, Peddinghaus

Recent Technology Advancements in the Plasma Cutting of Stainless Steel
Plasma cutting's high productivity, thick cutting capability, and low operating costs make it a great choice to cut stainless steel across a wide thickness range. Recent improvements in plasma cutting torches and systems have further enhanced plasma's capability when cutting stainless steel. This presentation will discuss the latest technologies that are being employed to improve stainless steel cutting.
Jesse Tyler, Hypertherm, Inc

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

NEW! F70: INDUSTRIAL APPLICATIONS IN LASER I

Laser Marking
High power, high brightness fiber laser markers are now offered up to 100W. This provides a tool to produce extreme marking speeds on copper, aluminum, as well as ferrous materials. Deep engraving can also be achieved with control on removal rates vs. engrave quality. An introduction to the technology and process capabilities with application examples will be given.
Geoff Shannon, Miyachi Unitek

NEW! F70: INDUSTRIAL APPLICATIONS IN LASER I (cont'd)

Hot Wire Laser Cladding and Joining
Laser cladding technology provides metallurgical bonding with a low heat input process. The laser enables precise control of the molten zone with the assistance of an integrated filler wire system. This hybrid laser cladding technology minimizes the heat affected zone in the base material. The presentation will cover the hybrid laser cladding process, metallurgical analysis of the process and applications involving hot wire laser cladding/welding.

Wayne Penn, Alabama Laser

Design for Laser Joining
As the use of lasers become more widespread, designers and product engineers alike need to gain familiarity with not only the properties, advantages and applicability of the laser welding process, but also with how to design components, assemblies and systems for successful laser welding. The choice of laser type, component material selection, weld joint design, component part preparation, and part fixturing are all critical to successful implementation of the laser welding process.

David Havrilla, TRUMPF, Inc.

Innovation & Emerging Laser Technology: The Critical Role of the Control
The impact of a CNC's characteristic are far reaching; a significant influence in overall system productivity. Decades of domain expertise are integrated into CNC functionality thusly delivering a powerful platform to develop versatile systems with diverse performance. Sustainability demands foundations which deliver predictable performance while fueling progressive innovation. Consistent product development is accelerated as generations of peak performance unveil even more precise solutions to the ever increasing need of speed, sequencing & synchronized motion.

Elizabeth Kautzmann, FANUC CNC America

FINISHING TRACK

MONDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

NEW! C10: BUILDING BLOCKS OF A POWDER COATING SYSTEM B

This presentation will discuss the building blocks of a well-designed, high-performing powder coating system, from pretreatment to powder application and recovery, to curing. Learn how to select a system to best meet your needs and ensure your chance of success.

Greg Dawson, Nordson Corp., Bill Owens, DuPont Industrial CoatingSolutions and John Sudges, Midwest Finishing Systems, Inc.

NEW! C11: RUNNING EFFICIENT LIQUID SYSTEMS A

Efficient Finishing Technologies
Finishing applications can gain significant efficiency with the use of electrostatic applicators. This presentation will demonstrate how to achieve higher transfer efficiencies compared to traditional spray applicators as well as show techniques that help drive optimal efficiency within the electrostatic spray process.

Blake Erickson and Wendy Hartley, Graco Inc.

Technology Advances that Helped Raytheon Design a Finishing System for the 21st Century
Raytheon's production of military products requires a special process known as CARC paint system (Chemical Agent Resistant Coating). Recently, the IADC (Integrated Air Defense Center), Raytheon's manufacturing facility located in Andover, MA upgraded their manual finishing system. In doing so they had some special requirements: a safer work environment for their employees, reduced energy costs, a small footprint, and traceability as parts moved through the system. Learn how they met their requirements and increased production.

Speaker from Raytheon and Josh Peterson, IntelliFinishing

10:30 a.m. – 12:30 p.m.

NEW! C20: AUTODEPOSITION & POWDER COATING HAND-IN-HAND I

Android Industries was looking for an environmentally "green" process that offered a lower cost alternative for finishing wheelchair-accessible mobility vehicles. They selected Autodeposition, a coating technology based on depositing an organic polymeric emulsion on a metal substrate. This process forms a uniform film over the entire surface of a work piece that flows into and around the most complex shapes. Android also decided to use a co-cure process involving a powder coated surface over

the Autodeposition. This session will walk you through the complete processes, to the successful installation of the equipment and production of parts.

John Cole, Parker Ionics, Kevin Hales, Azko Nobel Coatings, Inc., Jason Pfeifle, Henkel Corp. and June Nagle, Android

NEW! C21: WHEN TO USE A CUSTOM COATER B

There are a series of questions that need to be addressed when deciding whether to use a custom coater. What are the deciding factors one should consider to use a custom coater? How do you find a reputable custom coater? What information do you need to supply to ensure your job is done right? Can it be cost effective to use a custom coater and how do I determine that? This session will help you answer these important questions.

John Heyer, Kettle Moraine Coatings

1:30 p.m. – 3:30 p.m.

C30: POWDER COATING CONVERSION & CASE STUDIES I

Converting from Liquid to Powder: Doing the Research and Getting It Right

Mestek, Inc., a manufacturer of baseboard registers, previously painted parts using an omega loop liquid paint system. In making a decision to switch to powder, the capabilities to spray multiple colors and reclaim the powder were absolute musts. With so much at stake, considerable research went into the technology, equipment and powder materials. This presentation will detail Mestek's conversion from liquid to powder coating, from the system design and testing to the successful installation of their new powder coating systems and the results they were able to achieve.

Larry Fenik, Nordson Corp.

Liberty Safe: A Case Study

Liberty Safe & Security Products, Inc. is a leading maker of home and gun safes. A multimillion dollar finishing line improvement allowed Liberty to introduce new colors in the product lines, as well as reduce their environmental footprint. As Liberty looked to reintroduce products they previously produced overseas, another finishing line upgrade was implemented. This change allowed Liberty to take on increased production volume while providing flexibility for a multitude of product styles and colors. This presentation will provide a complete overview of the entire process as well as the results of their upgrade.

Charlie Haislip, Gema

Great Lakes Manufacturing Completes Its World Class Operation with a New, Fast-Color-Change Powder Coating System

Great Lakes Manufacturing, Inc., produces enclosures for information systems data centers. The trend in their

industry for more colors, and the desire to improve production throughput, flexibility and finish quality, were key reasons Great Lakes embarked upon a project to bring its powder coating operation up to par with the rest of its world class manufacturing capability. This presentation will discuss the limitations of its 10-year-old powder coating system, the requirements and objectives for its replacement, and the dramatic improvements achieved with its new, fast-color-change powder coating system.

Frank Mohar, Nordson Corp.

NEW! C31: FINISHING ESSENTIALS: CONVEYORS, RACKING & TESTING B

The Truth About Production Line Gaps and How Current Conveyor Technologies Address Them

Understanding the causes and ramifications of line gaps and how new technologies are addressing the problem is important to finishing operations. Line gaps result in overall reduced line speed and associated production throughput; quality issues; increased labor costs; inventory problems. Learn how new advancements in conveyor technology address these issues by enabling each higher density, racked load-bars to move at variable speeds throughout the system.

David Underhill, IntelliFinishing

"Corrosion Prevention Strategy" – How To Educate Yourself Utilizing Tools And A Total Cost Approach!

This presentation will provide insight on how specific tools assist in developing new corrosion resistant products. A performance testing and comparative analysis, necessary in developing a Total Cost Approach, will be reviewed.

John Spangler, Caterpillar, Inc.

Start Right, Finish Right

The initial phase of evaluating any new finishing line should be how parts will be hung on the line. This impacts overall line efficiency, loading/unloading and part presentation for pretreatment/coating/curing. This presentation will include the challenges that should be considered in order to maximize every aspect of the finishing line. Various technologies will be discussed, including unique racks, hooks and masks for conveyorized or batch operations. In addition, technologies will be presented that can economically improve production efficiencies for companies that already have finishing lines.

Bruce Bryan, Mighty Hook, Inc.

Paint Stripping Solutions
Clean fixtures are an essential element to every finishing operation. Should you do it in-house or outsource your paint stripping needs? This presentation will walk through the cost of performing paint removal internally and will identify all costs that need to be taken into account for a true comparison when considering outsourcing. Frequency of cleaning and ways to reduce cleaning cycles will be discussed.

Matt Kirchner and Bill Oney, American Finishing Resources

TUESDAY, NOVEMBER 13

8:00 a.m. – 10:00 a.m.

C40: CONCEPTOS BASICOS DE PINTURA EN POLVO EN ESPANOL B

En esta sesión, la cual será completamente en español, los participantes aprenderán lo que es la aplicación en polvo; los varios tipos de recubrimientos de polvo y sus apropiadas aplicaciones; los tipos de equipo requeridos para aplicar el recubrimiento de polvo; limpieza y pretratamiento de las piezas antes de la aplicación de pintura; y como los recubrimientos de polvo se curan. Los participantes obtendrán un buen entendimiento de la terminología básica de la aplicación en polvo y recibirán una copia del manual de entrenamiento "Cubierta Revestimiento de Polvo" publicado por el CCAI's.

Antonio Tapia, Efficient Systems Consulting de Mexicali, Antonio Gallegos, George Koch Sons, LLC, Hugo Cambron, Spraylat Corp., and Pablo Soto, DuPont Industrial CoatingSolutions

NEW! C41: FINISHING ESSENTIALS: THE IMPORTANCE OF CLEANING PRIOR TO PRETREATMENT I

Importance of Cleaning and Rinsing Prior to Pretreatment
To increase the effectiveness of the finish, parts must be cleaned prior to coating. This presentation will focus on different cleaning technologies and issues specific to the parts cleaning industry. It will provide a foundation of critical terminology used to enable intelligent decisions in the selection, design, installation, and upgrade of a cleaning system, and highlight topics including soils, substrates, cleaners, rinsing and drying.

Suresh Patel, Chemetall US, Inc.

Troubleshooting Cleaning & Pretreatment
Even when you think you've done everything right, problems can and do occur in the cleaning and pretreatment stages of finishing operations. The key is knowing how to recognize and solve the problem when they occur. This presentation will provide a myriad of ideas to help you troubleshoot your cleaning & pretreatment processes.

Jeff Watson, Custom Chemicals of Texas

NEW! C42: PAINT LINE EFFICIENCIES & ENERGY SAVINGS A

Improving Paint Line Efficiency
This presentation will review a wide variety of ways to make your paint line more efficient including use of sensors; safety tips; recycling; testing; computer hardware & software; staff training & retention; system backups; line maintenance and more.

Amith Pinapala, Cummins Power Generation Inc.

Maximize Energy Savings in Finishing
With ever-increasing cost pressures, manufacturers are required to do more with fewer resources. In today's competitive manufacturing environment, efficiency is essential to both survival and growth. Learn how to find the best energy efficient finishing solutions, how to determine if you qualify for Energy Rebates and how saving energy can directly impact your bottom line.

Bill Heuer and Nick Strauss, Graco Inc.

10:30 a.m. – 12:30 p.m.

C50: EFFICIENT PARTS CURING WITH INFRARED TECHNOLOGY B

This session will review the basics of IR including what it is, how it is produced and its characteristics. It will also review all equipment sources of infrared followed by a discussion of the wide variety of IR applications, which showcase the many ways in which IR can be utilized in today's industrial environment.

Steve Paternostro, Alabama Power Company, Mike Chapman, Vulcan Catalytic and John Podach, Fostoria Process Equipment, div of TPI Corp.

NEW! C51: A WORLD OF THEIR OWN: WHAT'S TRENDING IN COATINGS A

Sublimated Coatings – Reproducing Natural Grain Finishes
This presentation will describe an innovative decoration system that is permanently sublimated in powder coating to produce decorative finishes to metal profiles, sheets, MDF, high temp plastics and 3D accessories. The process reproduces the natural grain of various types of wood, marble, granite, custom design and corporate branding, enabling the simultaneous combination of a strong protective coating and an innovative decoration. The process is certified AAMA 2603 and AAMA 2604.

Eric Koslow, Decoral System USA Corp.

What's Trending in Architectural Coatings
Today, architectural powder coatings offer an alternative to more conventional liquid coatings used in building envelopes. Powder coatings meet or exceed all of the per-

formance requirements of AAMA, GSB and Qualicoat specifications. Still, the architectural coatings market is dominated by liquid coatings. Architectural powder coatings can provide a greener and more environmentally friendly alternative. Premium weathering non-TGIC HAA polyesters will bring new application advantages and challenges that will be addressed in this discussion. Applications from extruded aluminum building components, fencing and building accessories will be reviewed.

Mike Withers, DuPont Industrial CoatingSolutions

Coating Trends for the ACE Industries (Agriculture & Construction, Equipment)

Thinking about targeting the Agricultural and Construction Industry for your growing coatings business? Companies like Caterpillar, John Deere and CNH are continually developing their specifications to reflect improved requirements in corrosion and weathering resistance. This session will give you an overview of the size of the ACE Market, ACE coating specifications and how you will need to prepare your companies coating line for an expert finish in the ACE segment.

Mike Vrshek, DuPont Industrial CoatingSolutions

NEW! C52: HOW WORLD CLASS COATERS USE KAIZEN TO OPTIMIZE FINISHING LINE PRODUCTIVITY I

More than ever before, progressive coating operations are using Kaizen to drive efficiency improvement on their finishing lines. Productivity improvements of 40% to 300% are not unusual. This session will explain the Kaizen process, help you get started and show you who you should include on your Kaizen Team. Several real world examples of coatings operations that have used the Kaizen process to generate huge improvements in coatings line performance will be shared with the audience.

Matt Kirchner and Bill Oney, American Finishing Resources

1:30 p.m. – 3:30 p.m.

NEW! C60: TRENDS IN POWDER COATING APPLICATION EQUIPMENT A

Powder Spray Equipment – There's A Lot Out There, So Choose Wisely

This presentation will discuss the variety of different powder spray equipment available today, and how the choice of equipment can make a big difference in how easy, or difficult, it can be to get the results you are expecting. There are different powder charging technologies and gun types, powder pumps, delivery methods and controls, from the basic to the more sophisticated. By optimizing your system for your application, you can coat easier, faster, more efficiently, and with the highest finish quality.

John Carlson, Nordson Corp.

Trends in Color Change Equipment

This presentation will discuss emerging technologies in powder coating equipment including the evolution of the powder center; PLC total booth systems controls; and quick color change for the manual gun.

Loren Keene, Wagner Industrial Solutions

Advancements in Spray & Recovery Technology and the Impact on Powder Particles

Powder coating systems need to be flexible and efficient to process a variety of chemistry and powder formulations. Regardless of materials selected, ensuring sprayability, transfer efficiency, and reclaim handling is vital to having a successful operation. Today's equipment must be designed to reprocess powder particles in an easy and efficient manner. This presentation will highlight the advancements in manual and automatic coating systems and the impact the equipment may have on the material and application process.

Jeff Hale, Gema

C61: PROTECTING YOUR FINISHING OPERATION B

Spray Booth Safety

Safety is serious business. You need to know how to protect your system and employees. This presentation will review the basics of the International Building codes as it refers to the NFPA 33 for spraying of flammable liquids, and the newly revised NFPA 86 on oven design, equipment layout distances, and electrical codes. We'll discuss why equipment suppliers build equipment a certain way and what inspectors should be looking for. Codes and requirements for spraying of flammable liquids, powder coatings, spray booth design, oven design, and storage of materials will be reviewed.

Marty Powell, Global Finishing Solutions LLC

Business Continuity: You MUST Be Prepared

World events have shown us that we should not think that disasters and business interruptions can't happen to us. Are you ready for any number of situations that could impact your finishing operation? This session will help you understand what a business continuity & disaster recovery plan is, why businesses with finishing operations need one, and how you go about developing a good one.

Sam Woehler, George Koch Sons, LLC

B = Basic I = Intermediate A = Advanced

NEW! C62: INNOVATIONS IN PRETREATMENT A

Processing Aluminum through a Zinc Phosphate Pretreatment System

In today's environment, aluminum is being introduced more to reduce the overall weight of vehicles thus increasing gas mileage efficiencies. Under traditional guidelines, aluminum can be treated through a zinc phosphate process with a few modifications to the control parameters. As the aluminum exceeds the traditional levels, the parameters become increasingly more difficult to control. This presentation will discuss an alternative "flex" method to treating high amounts of aluminum through the traditional zinc phosphate pretreatment system.

Terry Giles, Henkel Corp.

Running Easy

Despite the many advantages of zirconium oxide, such as reduced energy, phosphate-free, low sludge, and high salt-spray performance, the majority of finishing operations continue to use iron phosphate. This presentation will focus on new technology and best practices that address the weakness of zirconium oxide pretreatment. We will give several examples of how our innovation has enabled end users, with prior negative zirconium oxide experiences, to successfully improve their coating pretreatment process.

Bruce Dunham, DuBois Chemicals

Modern Transition Metal Pretreatments – Cutting Your Pretreatment Costs

A brief review and definition of what a Modern Transition Metal Pretreatment is will be followed by a rich series of case histories. Potential for cost savings is highlighted and actual savings presented in some of the case studies. The presentation is designed to increase the comfort level of those new to non-phosphate pretreatments and to reinforce the decision of those who have already made the switch.

David Chalk, Galaxy, A DuBois Company

Innovations in Pretreatment: Advanced Non-Phosphate Pretreatments

Phosphorous and heavy metal discharge restrictions are becoming more widespread. Non-phosphorous pretreatments are viable alternatives and have the advantages of ambient temperature operation, produce no sludge, are simple to operate and waste treat, and they save money. The latest generation has performance approaching or matching zinc phosphate. Practical aspects of transitioning to advanced pretreatments will be discussed.

Gary Nelson, Chemetall

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

NEW! C70: MANUAL POWDER COATING: THE BASICS B

Part Cleaning & Pretreatment in a Manual Operation

Cleaning and pretreating parts in a manual finishing operation is critical to achieving a high quality finish. This presentation will help you understand how to properly clean and pretreat parts prior to powder coating in a manual operation.

Ken Kaluzny, Coral Chemical Company

Techniques for Manual Powder Coating

For many operators, deciding how to maximize powder coating coverage and transfer efficiency is a challenge. Learning correct techniques is critical to successful powder coating applications. This presentation will cover performance techniques suitable for all brands of powder guns and will review tip selection, coating techniques and how to address recoats and metallic powders.

AJ Smotherman, Gema

Curing for Manual Powder Coating Operations

This last step in the powder coating process is critical to achieve the high quality finish you want. This presentation will provide information to properly cure powder coated parts in a manual finishing operation.

Ron Cudzilo, George Koch Sons LLC

C71: ADVANCES IN PORCELAIN ENAMEL B

This presentation reviews the recent developments in porcelain enamel materials and processing. The unique chemical bond of the glass coating to the metal leads to the excellent durability of porcelain enamel in severe environments. Several keys to successful design and manufacture of porcelain enameled parts/products is discussed; costs and features are compared with alternative coating materials.

Cullen Hackler, Porcelain Enamel Institute

10:30 a.m. – 12:30 p.m.

NEW! C80: COST SAVING MEASURERS FOR POWDER COATING A

System Design Parameters that Save Money

The way you design your finishing system can play a big role in cost savings for your finishing operation. This presentation will review the system design considerations that lead to saving money while producing a great finished product.

John Sudges, Midwest Finishing Systems, Inc.

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The "Green Washer"
The industry has focused pretreatment improvement efforts on temperature and phosphate reduction. This isn't enough. Surfactants are in-use today which can be formulated to emulate phosphates and reduce our dependence on highly alkaline base materials. Zirconium technology performs at near ambient temperatures without phosphates or regulated heavy metals. New sealer technologies enhance system performance like their predecessors, but without heavy metals of the past. By the end of this session, we will define the reality of today's "Green Washer".
Dave Schimpff, DuBois Chemicals

Cost Saving Measures for Powder Coaters
Now more than ever, minimizing your coating cost is critical to remain profitable and competitive in the marketplace. Whether you have a small batch system or a large conveyor line, there are often overlooked cost saving opportunities to run more efficiently and cut costs. This session will look at some of the most commonly overlooked cost saving measures on your powder coating line.
Matthew Rush, DuPont Industrial CoatingSolutions

Reducing Energy Costs on your Powder Coating Line
Energy usage can be one of the biggest expenses in running a finishing line. You can reduce your costs with the energy reducing tips you will learn from this presentation.
Sherrill Stoenner, Stoenner Finishing Consultants, LLC

C81: INTRODUCTION TO ELECTROCOATING B

Electrocoating uses an electrical field to migrate charged colloidal particles onto an oppositely charged conductive electrode and is highly efficient with the ability to give uniform film thickness and coat complex objects. Electrocoat systems are easy to automate and control, and have operational robustness. This session will review the two types of electrocoating processes, anodic and cathodic and both epoxy and acrylic based paints. Two coat systems can be used which offer both forms of protection. Variations of pigments and resins are used every day to coat many different items, improving their performance and durability.
Paul Kolesar, PPG Industries

FORMING & FABRICATING TRACK

MONDAY, NOVEMBER 12
8:00 a.m. – 10:00 a.m.

F11: ROLL FORMING FUNDAMENTALS B

Basic Roll Design
Roll design is critical to the success of your operation. During this session, learn basic roll forming design principles that will help you make your designs more functional.
John Kopsick, Formtek Metal Forming

Fundamentals of Roll Forming
Roll forming is a growing industry in North America. Over the last five years new industries have been looking for alternative ways to process metal parts in high volume and great lengths. Learn how to design and produce parts with confidence regardless of the material by developing an understanding of the typical roll form process and what can be rolled formed.
Brian Rodgers, Roll Forming Corp.

NEW! F12: DESIGNING PARTS FOR SHEET METAL A

Reducing Costs Through Innovative Sheet Metal Design
This presentation will change the way a designer thinks about the entire part design process from start to finish. New designs must be innovated from the start, by beginning with the end in mind and incorprating all the necessary oprations, including laser cutting, punching, bending, laser and conventional welding. The end goal is to reduce processes and mistakes, and ultimately costs.
Grant Hagedorn, TRUMPF, Inc.

Press Brake - Part Design and Forming Fundamentals for Operators, Supervisors and Engineers
In metal fabrication operations, too frequently a disconnect occurs between the part design and the ability to successfully form the part to the specified tolerance. This presentation provides a basic understanding of press brakes and press brake tooling so operators and engineers can form quality parts.
Todd Kirchoff and Mark Watson, Cincinnati Inc.

10:30 a.m. – 12:30 p.m.

F21: GENERAL TO ADVANCED ROLL FORMING CONCEPTS A

Update Your New or Existing Roll Forming Lines with Added Value Options with "In-Line Punching and Cut-off Solutions"

Learn how to integrate your roll forming lines with cutoff and punching operations so that your line produces finished parts. Integrations can include simple cutoff methods to more complex applications producing holes, slots, notches, and cutting the part to length using various dies, presses and measuring systems. Participants are welcome to bring samples of parts for review.

Paul Williams, Formtek, Inc.

Roll Form Tooling Setup and Trouble Shooting

Learn the proper way to install roll form tooling and make the necessary adjustments, as well as develop the necessary techniques to help trouble shoot problems. Roll tooling designs, setup documentation, and roll form tooling build standards will be discussed.

Steve Ebel, Roll Form Solutions, Inc.

1:30 p.m. – 3:30 p.m.

F31: WHAT'S NEW IN PRESS BRAKES WITH TECH TOUR B

The Other Side of Press Brake Automation

This presentation will turn everything you know about press brake automation in-side-out. Research shows that the implementation of smaller batches to reduce lead-times, the push to reduce stock levels by manufacturing the correct quantity (no extras), and long machine setups are having a negative impact on press brake productivity. Learn how press brake automation can help.

Paul LeTang, LVD Strippit Inc.

Hybrid & Electric Press Brake Technology

With energy commodity experts forecasting electricity rates to increase at rates of 3-5% for the foreseeable future, high-tech press brakes make more sense than ever. In addition to energy savings, learn how machine stability and part accuracy are significantly improved due to lower machine operating temperatures.

Casey Schlacter, Mitsubishi

Sheet Metal Bending in the 21st Century

This presentation will take a look at how evolving technology and modern social priorities are driving the way press brakes are designed and supported, from bending technology on your mobile phone to energy efficient electric machines that bring "green" values to the factory floor.

Tom Bailey, TRUMPF, Inc.

F32: ESTIMATING: MADE TO ORDER I

Learn how to effectively estimate the costs for a job, and win the bid! How to manage request for quote, material needs, operation time and large assembly estimating will be covered.

David Ferguson, MIE Solutions

TUESDAY, NOVEMBER 13

8:00 a.m. – 10:00 a.m.

NEW! F41: TOOLING SOLUTIONS FOR METAL FABRICATION B

Emerging Press Brake Tooling Technologies - New Products That Increase Productivity and Expand Flexibility

This presentation will focus on some of the new press brake tooling technologies that have recently become available and provide insight into what applications they are best suited for and how they can best be used to minimize tooling costs and maximize press brake productivity.

David Bishop, WILA USA

Cost Savings Techniques for Sheet Metal Fabrication

Learn ways that you can reduce costs throughout your sheet metal fabricating operation by increasing machine uptime, reducing secondary optimization, and improving setup and staging.

Dennis Lowry, Mate Precision Tooling

Metallurgy of Tooling Materials

Learn to recognize the various factors that can affect the performance of tooling materials used in metal fabrication processes. You will understand the basics of grade selection, failure mechanisms, and the methods and treatments that can enhance tooling performance.

Gary Maddock, Zapp Tooling Alloys

F42: AUTOMATED DEBURRING: A SURPRISING COST & TIME SAVING WITH TECH TOUR B

Each deburring machine has its advantages. Learn what type of deburring machine will work best for your operation, so you will achieve the optimal performance and obtain the best finish possible while still reducing costs.

Gregory Larson, Timesavers, Inc. and
Erik Vanstrum, 3M Company

B = Basic I = Intermediate A = Advanced

10:30 a.m. – 12:30 p.m.

F51: EFFECTIVELY SLITTING AND BLANKING COILS I

Slitting to Achieve the Best Result
Learn how to produce quality slit edges while maximizing the life of your tooling no matter what the material is by avoiding costly mistakes, identifying problems and taking corrective measures.
Al Zelt, ASKO Inc.

Precision Coil Slitting
Learn how you can make your slitting operation more efficient and productive while still processing quality product regardless of the material grade. New technology, improved techniques on existing equipment, and the concept of a leveler on a slitting line can help you process surface critical materials and high strength materials and improve your overall slitting quality.
Ray Kuch, Braner USA, Inc.

New State-of-the-Art Coil Slitting Technology
Achieve tighter tolerances and greater productivity on your slitting line with new innovations, such as CNC slitter head control, slitter head tooling set-up, tooling change-over, vacuum roll strip tensioning, scrap handling, traversing brake roll unit, multiple zone tensioning pad, and equipment guarding for greater operator safety. Learn about the latest advances in oscillate slitting with multiple coils.
Peter Swenson, Burghardt & Schmidt

Advances in Blanking
Today the manufacturing process often has more to do with determining the blank tolerance requirements than the actual product being manufactured. A lot of confusion remains regarding blanks: what is the proper way to measure them, what types of CTL/Blanking lines are best suited to produce the most accurate parts, and why? This presentation will discuss common questions and misconceptions.
Dean Linders, Red Bud Industries

NEW! F52: PLATE FABRICATION I

Lifting Magnets - Choosing, Using & Benefitting
Understand the basics of magnetic material handling, everything from the basic principles of how magnets work and the differences between the various types of magnets to the potential applications for lifting magnets. Special emphasis will be placed on plate-handling and loading and clearing cutting tables efficiently.
Dave Wilber, Walker Magnetics

Plate Rolling Fundamentals - The How-To's of Getting the Job Done
Understand the concepts and techniques used by industry experts to achieve outstanding plate rolling results. Learn the basic principles of roll technique, material thickness variances, and tips to help you become more effective in rolling material.
Matt Moore, JMT

Better Holes with Plasma: What You Need to Know to Take Hole Cutting to the Next Level
While many acknowledge the difficulties in using plasma for hole cutting, advancements in technology have enabled a way to significantly improve hole quality from a functional perspective while lowering operating costs. Learn how to produce a hole regardless of your application.
Dan McLenithan, Hypertherm, Inc.

1:30 p.m. – 3:30 p.m.

NEW! F61: HOW FLAT IS YOUR MATERIAL? ADVANCEMENTS IN LEVELING TECHNOLOGY A

Changing Shape of Flat Rolled Metals
The secret to upgrading the flatness of flat rolled metals is to understand shape defects and basic metallurgy determining material behavior. Learn how to select the right equipment based on its capabilities.
Thomas Hazen, T.F. Hazen, PE Consulting

ULTIMATE Laser-Quality Metals - How?
The use of lasers is growing exponentially around the globe due to their speed, productivity, accuracy, flexibility, cut-quality, low-energy consumption, and very low scrap-ratio attributes. Fabricators, metal producers/processors, and metal consumers need to understand what it takes to process perfect laser-quality metals to be prepared to serve this growing market.
Bob Sipp, Leveltek International LLC

Beyond Coil – The Unique Challenges of Leveling Parts
Flatter parts can reduce manufacturing time, lower product costs, and produce parts with tighter tolerances. This presentation examines and contrasts different methods used in the market place for leveling, flattening or straightening parts, outlining the best practices being used and highlighting the latest advancements in leveling technology.
Jurgen Jost, Arku Coil Systems, Inc.

New Innovations in Leveling
With the increased use of lasers, it is more important than ever that material is flat. Understand the latest technology available for measuring flatness and how to equalize external stresses by utilizing the new e-drive technology.
Brownie Cox, Bradbury Company, Inc.

LEAN TRACK

FORMING & FABRICATING TRACK

NEW! F62: USING ROBOTICS IN METAL FORMING & FABRICATION I

Getting Started With Robotics
Learn what automation systems are available, the differences in robotic applications, and the pros and cons of introducing robots into your operation. How to evaluate robotic equipment and suppliers and effectively budget for robot applications so you can select the right automation system for your organization will be discussed.
Bob Rochelle, Staubli Corp.

Robotics, State of the Industry and Technology
Learn what is new in robotic technology and solutions currently available to manufacturers interested in a more intelligent robot.
Michael Sharpe, FANUC Robotics

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

NEW! F71: MAXIMIZING YOUR PRESS BRAKE A

Maximizing Press Brake Productivity
Learn how the latest technologies available on the market today can help you maximize the productivity of your press brake.
Scott Ottens, Amada America Inc.

Double Your Press Brake Parts Output
This presentation will show you how to rethink the way you form parts! By purchasing the right options on a press brake, you can easily double your production by making more parts and reducing your operation costs. Learn which options will increase your part quality and speed.
Gerrit Gerritsen, Bystronic

LEAN TRACK

SUNDAY, NOVEMBER 11

1:00 p.m. – 5:00 p.m.

F01: WORKSHOP: LEAN MANUFACTURING FOR MANAGERS

See page 8 for details.

MONDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

F13: LOW VOLUME, HIGH VARIETY, NO PROBLEM FOR LEAN I

In this session, we will tackle the myth that lean does not work in a job shop environment. Focused on market-driven objectives, we will address the problems you face, discuss ideas and suggestions, and ultimately provide the solutions that will drive productivity throughout your business. This presentation will give you the tools to ensure a competitive advantage and provide the economic benefits (ROI) you need.
Tim Winder, Technical Change Associates, Inc.

10:30 a.m. – 12:30 p.m.

NEW! F22: PROFIT DESTROYERS: FINDING & FIXING THEM A

High overall efficiencies in a high mix, low volume environment are difficult to obtain. Challenges like scheduling, constant changeover, and other issues put a drag on overall efficiency and productivity. Learn how to easily find, assess, and fix these efficiency killers by simply learning to see and measure them.
Richard Kallage, KDC & Associates, Ltd.

1:30 p.m. – 3:30 p.m.

F33: INTRODUCTION TO 5S AND THE VISUAL WORKPLACE I

5S Visual Workplace is a workplace organization methodology to improve productivity by eliminating waste, and improve quality by reducing variation. Learn how 5S reduces wastes due to internal transport, motion, and wait, and builds a solid foundation for the implementation of flow production, visual management and standard operations.
Anthony Manos, Profero, Inc.

TUESDAY, NOVEMBER 13

8:00 a.m. – 10:00 a.m.

NEW! F43: INTRODUCTION TO VALUE STREAM MAPPING A

People often mistake value stream mapping for process mapping. Process mapping simply involves mapping any process. Value stream mapping involves mapping information and product flow for a given value stream. Learn how the mapping is done in such a way that allows one to visualize the current state and to plan and implement a future state with measurable goals.
Anthony Manos, Profero, Inc.

B = Basic I = Intermediate A = Advanced

MANAGEMENT TRACK

MONDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

NEW! F14: SAFETY AND PRODUCTIVITY FOR A RESPONSIBLE PARTNERSHIP I

Creating a Corporate Safety Culture
A successful corporate safety culture begins with all levels of management showing a visible commitment to safety. Employees must also be engaged and empowered in key decision areas. Add relevant and effective training – job task and safety, providing the proper tools and equipment, and implement appropriate safeguarding – the task becomes easy!
Kelly Langdon, Buhler Aeroglide Corp.

The Regulatory Environment
A variety of standards and regulations have been defined for machine safety. To successfully implement a safety culture, an understanding of how these standards and regulations effect operations needs to be incorporated into your business.
Steve Aamodt, SICK, Inc.

Successful Implementation
Successful application-specific safeguarding requires building an integration team that pulls together expertise from various stakeholders, including a qualified safety integrator, the machine manufacturer, the safety device manufacturer, and key constituents within the organization.
Douglas Raff, Paragon Industrial Controls, Inc.

Understanding the Pressing Need
With the aging workforce and the skill set shortage occuring in the manufacturing enviornment, it is essential your safety culture be one with your people, production, and profit.
Brian Roberts, CNA Risk Control

10:30 a.m. – 12:30 p.m.

NEW! F53: FACILITY DESIGN AND LAYOUT FOR LEAN MANUFACTURING I

Getting the layout right is the most important aspect of Lean Manufacturing. You can create the optimal facility plan by minimizing transportation and lost motion so that productivity is greatly improved. By involving and training employees, you facilitate the lean culture at the same time. Creating flexibility in the layout will allow for future growth and product expansion. Finally, learn how using monuments and constraints to your advantage is possible and necessary
Brad Muir and Kim Dixon, Technical Change Associates, Inc.

1:30 p.m. – 3:30 p.m.

NEW! F63: QUICK CHANGEOVER TECHNIQUES TO REDUCE SET-UP TIME A

When your machines are not running, you are not producing finished parts. Learn how Quick Changeover can reduce your defect rates, lower inventory costs, increase production flexibility, and improve on-time delivery. You'll reduce the number of setup adjustments, reduce the number of batches, increase output and improve overall timeliness of response to customer orders.
Richard Kallage, KDC & Associates, Ltd.

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

NEW! F72: INTRODUCTION TO TOTAL PRODUCTIVE MAINTENANCE I

Total Productive Maintenance (TPM) is a maintenance program which involves a newly defined concept for maintaining plants and equipment. The goal of the TPM program is to markedly increase production while, at the same time, increasing employee morale and job satisfaction.
Anthony Manos, Profero, Inc.

10:30 a.m. – 12:30 p.m.

NEW! F80: THE SIX SIGMA PROBLEM SOLVING STRATEGY IN A "NUTSHELL" A

Six Sigma is the powerful actor on the process improvement stage. However, many are reluctant to engage the program because it seems so complex. But at its core, Six Sigma is really very simple. In this session, you will learn the simple core strategy, and be able to begin applying it to the problems you face.
Denton Bramwel land Wayne Stewart, Promotory Management Group, Inc.

B = Basic I = Intermediate A = Advanced

F15: SOCIAL MARKETING ON SPEED – CRASH COURSE I

Social marketing can be the best thing that ever happened to your manufacturing business. But Facebook, LinkedIn, and YouTube can eat you alive with hours of unproductive time squandered online. Learn powerful techniques and tools to harness the power of social media with maximum effectiveness and a minimum time commitment.

Jon Goldman, Brand Launcher

10:30 a.m. – 12:30 p.m.

F23: DRIVING HIGH PERFORMANCE THROUGH EMPLOYEE ENGAGEMENT I

This session will focus on how to get the most out of your employees by responding to and fulfilling their basic needs — feeling valued. Learn how to motivate your employees even in a tough economy and build overall employee engagement.

Mark Ernst, Ernst Enterprises, LLC

NEW! F24: ONLINE MARKETING FOR MANUFACTURERS: GROWING YOUR BUSINESS USING THE WEB B

Learn everything you need to know about digital marketing for manufacturers, so you can succeed online while on a budget. How to build a great website, set a budget for online marketing activities, use a content management system to grow your online capabilities, use social media to drive busienss, and get to the top of Google and other search engines without paying for it will all be discussed.

Chris Schmitt, American Roll Form Products

1:30 p.m. – 3:30 p.m.

NEW! F34: SURVIVAL & SUCCESS THROUGH SHARED LEAN VISION I

Since 2005, Superior Tube has been collectively heading down the Lean path with a shared labor/management vision and direction. The commitment to continuous improvement has enabled the company to experience 50% top line growth and 150% profitability improvement while adding 40 new employees. Hear about "how" lean can work, not just "what".

Anthony Jost, Superior Tube Company, Inc.

NEW! F35: LET'S ALL PLAY NICELY TOGETHER: MANAGING BOOMERS, XERS, AND YERS IN YOUR BUSINESS A

Chances are, your business will soon include Baby Boomers (born 1946-1964), Generation X (1960s and 1970s), and Generation Y (1982-2000). These groups don't just think, talk, and work differently — they have vastly different expectations for each other, your company, and you. This refreshingly practical session reveals simple strategies for owners or managers to get everyone "on the same page" and shows you how to "bridge the gap" between employees.

Jon Goldman, Brand Launcher

TUESDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

F44: A PRACTICAL APPROACH TO DEVELOPING A STRATEGIC PLAN FOR THE JOB SHOP I

Unless you plan for the future and take the necessary steps to make sure your people, technology, and processes are at the forefront, you will be a follower and lose your competitive advantage. Learn how to develop and implement a strategic plan for your operation.

Mark Ernst, Ernst Enterprises, LLC, and Matt Koester, Koester Metals, Inc.

NEW! F45: DEVELOPING A WINNING SALES FORCE I

Unfair Advantage: How To Earn 20% of a Manufacturers' Reps Time Even Though You Are Only 10% of Their Income

Want to get 20% of your reps selling time while only providing 10% of that rep's income? It can be done! Learn how to become your rep's "emotional favorite" and get much more selling time for your line than the rep could justify by hard commission numbers alone.

Charles Cohon, Manufacturers' Agents National Association

How to Win with an External Sales Force

This session will highlight a step-by-step process to setup a successful external sales force. Learn what a manufacturer needs to consider and how to make the economics work.

Richard Kallage, KDC & Associates, Ltd. and (Joe) Mayer, Mayer Business Group, LLC

10:30 a.m. – 12:30 p.m.

NEW! F54: MERGER, ACQUISITION, & CAPITAL REVIEW – PREPARING YOUR COMPANY FOR A LIQUIDITY EVENT A

This presentation will focus on the critical business drivers that strategic and financial buyers, investors, and lenders use in the valuation of a business during a merger, acquisition or captial review. Recognize how

succession planning, accounting structures, deal structures, and tax considerations influence transactions and can affect the valuation of a company.

Daniel Boarder, Tony Giordano, John Kmetz, BKD, LLP

NEW! F55: STRATEGIES TO HELP CUSTOM MANUFACTURERS INCREASE SALES & LEADS I

Custom manufactuers and job shops can drive leads and generate sales from the Internet. Learn how to help companies find you, replicate sales strategies typically used in person, create web content that will generate leads, and generate more RFQ's for increased sales revenues.

Joseph Nieckarz, Thomas Industrial Network

1:30 p.m. – 3:30 p.m.

NEW! F64: CATAPULT THE COW — CASE STUDIES IN LEAN MANUFACTURING I

By way of case studies, video, before and after photographs and real life stories, this presentation will describe how many manufacturing organizations are refusing to just give up to foreign competition, but rather are catapulting the cow by utilizing limited resources to change the way they do business. Each attendee will receive a free copy of the book *Catapult the Cow.*

Gary Conner, Lean Enterprise Training

NEW! F65: MANUFACTURING METRICS: TRAINING TO DRIVE SUSTAINABLE BUSINESS PROCESSES A

Learn how to drive business objectives down from top-level management to the hourly employee by establishing expectations and auditing procedures that drive measureable results, developing a structured communication plan, and executing and action plan that holds people accountable for results within their realm of responsibility. By implementing these techniques, you'll promote continuous improvement in communication, productivity, employee satisfaction, and bottom line business results.

Shane Yount, Competitive Solutions, Inc.

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

F73: IMPLEMENTING LEAN MANUFACTURING IN A HIGH MIX – LOW VOLUME SHOP I

Learn which lean initiatives make sense for a small and mid-sized shop and how a typical fabricator should be able to achieve 30% cost reduction by implementing the right lean techniques and use their ERP system to support lean across the entire organization from the shop floor to the front office.

Dave Lechleitner, Exact JobBOSS

NEW! F74: LEADERSHIP: SUPPORTING GROWTH AND PROFITABILITY A

The global manufacturing environment coupled with the skilled labor shortage and the different value system of the new generations coming into the workforce requires a new paradigm to lead successfully. Identify and master the skills that every leader needs to acquire in order to support growth and profitability and adapt these leadership skills for lean manufacturing operations.

Richard Kallage, KDC & Associates, Ltd. and (Joe) Mayer, Mayer Business Group, LLC

10:30 a.m. – 12:30 p.m.

NEW! F81: BACKSHORING/ RESHORING: A MANUFACTURING OPPORTUNITY

Manufacturers are beginning to "backshore" production of product segments to the U.S. from China and other Asian countries as a result of increases in production costs, salary wages and benefits, duties and taxes, transportation, raw materials, and inventory carrying costs. Learn what this means for a regional contract manufacturing company and how to position your company for backshoring opportunities.

Alan Lund, UHY Advisors, Inc.

STAMPING TRACK

MONDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

NEW! S10: TOOL STEELS TO IMPROVE DIE LIFE I

Use of Surface Engineered Pre-hand HRC 45 Toolsteel in Forming Applications

Learn the results of laboratory tests pertaining to the influence of die surface conditions on die adhesive wear when forming .95 mm thick DP 600 sheet. The tests clearly show that as long as the die steel matrix has high enough yield strength to operate in elastic mode in the actual forming operation the die life length is governed by its surface condition. Faster die manufacturing can thereby be carried out when using pre-hardened tool steel and, if necessary, tailor-make the die surface properties to achieve the desired die life length.

Per Hannson, Tooling Steels and Thomas Schade, International Mold Steel

A New Tool Steel for High Toughness High Wear Tools

PM-manufactured tool steels have traditionally offered higher wear resistance alternatives to D2, M2, and other conventional tool steels. Grades such as PM M4 (4% V) and A11 (10% V) are common for long wear life tools. ASP 2005 is a new PM tool steel designed to reduce the risk of breakage or cracking, while maintaining the level of abrasion resistance required for good productivity. This presentation will discuss the development and properties of this grade, review the properties of commonly available tool and die steels, and relate steel properties to failure modes and performance expectations.

Ed Tarney, Erasteel, Inc.

NEW! S11: IMPROVING BUSINESS RESULTS THROUGH EFFECTIVE COST MODELS AND TRAINING I

Metalforming Pioneer: Development and Implementation of Press Operator Training Program

Will describe the development and application of its internally-developed, comprehensive Automatic Press Operator Training Program and its new Technician Training Program, both of which foster skills enhancement and employee advancement, as well as its career paths and job posting systems. Learn how you can introduce and refine similar programs in your facility.

Keith O'Brien, Pridgeon & Clay

Metalforming Pioneer: In-house Training | Cross-Training | Project Management

Learn how an internal training program, emphasizing aspects of cross-training, training metrics and career paths, along with a project management initiative, together, have nurtured employee and company success.

Dave Rugaber, Oberg Industries

Current Purchasing Practices and Trends in Utilizing "Should Be" Cost Models when Evaluating Stampings

This presentation will provide an overview of the various ways cost engineers/estimators develop "should be" cost models and how buyers use these cost models to analyze and benchmark supplier quotations.

Jeoff Burris, Advanced Purchasing Dynamics, Inc.

10:30 a.m. – 12:30 p.m.

S20: INTRODUCTION TO FORMABILITY ENGINEERING AND ANALYSIS B

An introduction to the Science of Formability analysis in both the advanced engineering and production areas of stamping will be presented. Participants will learn about the principles of formability analysis. Formability analysis in the form of circle grid, as well as leading edge computer simulations will be used in the session to introduce the participants to the concepts required to apply formability engineering. Forming limit diagrams, thinning limit diagrams, and computer simulation outputs will be used to illustrate the principles. Failure modes such as splitting, wrinkles and springback variation will be covered in detail.

Eric Kam, AutoForm Engineering USA

NEW! S21: CASE STUDIES — IN-DIE SENSOR APPLICATIONS & GROWING TALENT THROUGH INTERNSHIPS I

Basic Through Advanced In-Die Sensor Applications

This session is applicable to all forms and speeds of metal stamping and will showcase hundreds of actual tooling examples from the very best practitioners in the field of dies and sensors. Self-adjusting dies that compensate for material changes will also be featured. The session is designed for technical as well as managerial metalforming personnel.

George Keremedjiev, Tecknow Education Services, Inc., Shawn Callahan, Tower Automotive, John Moore, Tower Automotive, and Matthew Reynolds, Tower Automotive

Metalforming Pioneer: An Internship Model

The presentation will discuss developing a successful internship program by working with a local high school and exposing students to careers in manufacturing, thus growing the base and identifying potential employees to grow your business.

Dane Belden, McGregor Metalworking Companies

1:30 p.m. – 3:30 p.m.

S30: PROGRESSIVE STRIP LAYOUT & STAMPING ESTIMATING B

Progressive Strip Layout

Basic rules and concepts to understand the design of a progressive die strip layout and the thought process for determining the strip layout from the CAD model will be discussed.

Derek Peeling and Dan Marinac, Forming Technologies Inc.

Stamping Estimating

Learn the fundamentals for estimating the cost of stampings and tooling as well as methods and formulas for determining piece price and tooling costs.

Derek Peeling and Dan Marinac, Forming Technologies, Inc.

NEW! S31: EFFECTIVE C.I., SAFETY, AND WORLD CLASS IDEA CULTURES I

Metalforming Pioneer: Developing an Effective Continuous Improvement Culture

Hear how one company successfully built a continuous improvement culture whereby employees take ownership of costs and improvements, reaping many benefits both to the company and its employees.

Ray Leathers, Roll Forming Corp.

Metalforming Pioneer: Pioneering a Safety Culture

In this session, a world-class safety program which has resulted in increased performance and productivity for its customers, cost savings for the company, a positive work environment, financial incentives, and retention for its employees will be shared and discussed.

Erick Ajax, EJ Ajax & Sons, Inc.

Metalforming Pioneer: Employee Involvement — A World Class Idea Program

The presenter will outline an employee suggestion program which resulted in 7,068 individual improvements generating a significant cost savings in 2011. More than 90% of the company's employees participate in the program.

Dale Dulyea, GR Spring & Stamping, Inc.

TUESDAY, NOVEMBER 13

8:00 a.m. – 10:00 a.m.

NEW! S40: ADVANCES IN STAMPING TECHNOLOGY: SERVO DRIVES & IN-DIE FASTENING I

Servo Drives and Forming Flexibility - Growing Your Production Mix

This presentation is best suited for manufacturers with in-house tool and die capabilities, involved in new product design and production, and/or looking to diversify. Attendees will be introduced to an overview of servo press forming using application examples to demonstrate the increased flexibility and capacity. Some examples include reduced die stages, difficult materials, process consolidation, in die value-added, and more. Learn how different motor and drive configurations impact servo press performance and capacity, including "rhythm" and "pendulum" slide motions. A real-life scenario to demonstrate the financial pay-off of employing servo press technology will also be used.

Randy Kish and Mike Madden, SEYI America, Inc.

Gaining a Competitive Advantage through In-die Fastener Installation

This presentation focuses on the advantages of installing fasteners within the stamping process. Attendees will gain the ability to determine when an In-Die system is appropriate and how to properly evaluate a project and recognize a good opportunity. A full description of the individual elements of an In-Die system and how it functions together to form a complete system will be reviewed including working animations of the internals of the die tooling and photographs of typical and unique projects.

Roger Patton, PennEngineering

10:30 p.m. – 12:30 p.m.

NEW! S50: ENHANCING QUALITY THROUGH EFFICIENT HOLE PUNCHING & SPRINGBACK CONTROL I

Improving Hole Quality and Tool Life in Thick Metals with Dual Head Punches

Thick metal stock creates some special challenges for punching high quality holes. The challenge is to achieve excellent hole tolerance with a high quality shear edge of 80+%. Most often the approach taken is to punch a hole with an under sized punch, shift the part to a new location, and utilize a shave punch to achieve final hole dimensions and acceptable sheared edge quality. By contrast the DHP accomplishes the punch and shear in a single press stroke at one position. A combination of punch tool design and the science of metal flow are responsible for this outcome. The end result is a pierced hole to specifications along with an 85+% shear for each hole. This presentation includes a technical discussion and case studies.

Peter Ulintz, Anchor Manufacturing Group, Inc. and Anthony Lockhart, M.O.M. Tools, LLC

Springback: Recognizing and Reacting to Variation

In this session the sources of springback in the metal stamping environment will be discussed in practical as well as theoretical terms. The session assumes a prior knowledge of basic sheet metal mechanical properties and stamping theory. Participants will understand the sources of springback variation. Process variation and process control, as well as simulation of springback and appropriate countermeasures will be discussed.

Eric Kam, AutoForm Engineering USA

1:30 p.m. – 3:30 p.m.

S60: STAMPING HIGH STRENGTH STEEL IN PROGRESSIVE DIES I

This presentation addresses problems specific to high-strength steels, including AHSS grades. Topics include: press selection, die design considerations, feeding and straightening considerations, selecting die steels for optimal tool life and establishing product design strategies to assure manufacturability.

Peter Ulintz, Anchor Manufacturing Group, Inc

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

NEW! S70: IMPROVING STAMPING EFFICIENCES THROUGH MEASURING & RIGHT SIZING EQUIPMENT I

Efficiency Improvements in the Stamping Shop
This presentation describes a way to automatically collect production data such as uptime, downtime, reasons for downtime, and parts counts directly from the machine, with a minimum input from the operator. Case studies are provided from stampers that have shown significant productivity gains with minimal (or zero) investment by using automatically collected production data.
Jim Finnerty, Wintriss Controls

Right-Sized Equipment for Lean Manufacturing
This presentation explains the philosophy behind right sized equipment design and how it fits into a lean production environment. Attendees will learn how to design tooling and equipment to produce parts at the same rate as customer demand. Specific examples of right-sized equipment and how production flow is simplified and waste is eliminated will be presented.
Ken Lambie, Lambie Engineering, LLC

10:30 a.m. – 12:30 p.m.

NEW! S80: STAMPING PRESS MAINTENANCE — PREVENTIVE & PLANNED OBSOLESCENCE I

Planned Obsolescence - Critical for Today's Press Maintenance
This presentation will cover preventive maintenance and its impact on productivity and current trends influencing maintenance globally. Learn the root causes creating risk and strategies to avoid these risks. Lessons learned from NAFTA tiers & OEMs will be discussed and recommendations to reduce risk for the NAFTA aging presses will be provided.
Esther Holewa, Schuler Inc.

How To Design and Implement World Class Preventive Maintenance in the Press Room
This presentation will cover the entire press maintenance arena, identify specific areas that should be focused on and present several different options for implementation. Examples of companies who have had success with introducing a preventive maintenance program in their stamping operations will be presented.
Jeff Fredline, Columbia Machine Works

TUBE & PIPE TRACK

MONDAY, NOVEMBER 12

8:00 a.m. – 10:00 a.m.

NEW! F16: ADVANCEMENTS IN WELDED TUBE PRODUCTION I

Trends in the Global Tube and Pipe Industry
The global Tube and Pipe industry has experienced growth, technologicial development, and emerging new markets over the past five years. This presentation will discuss how these recent technological advances and efforts have improved materials, process, and performance.
Kris Livermore, Thermatool Corp.

Controlling HF Weld Quality Part 1: Proper Selection of Power, Frequency and Coil Design
The quality of your weld and weld zone stability is determined by the power, frequency, and coil design and its placement to the weld. Learn how to achieve maximium quality by developing methods to control and optimize power and frequency, and selecting the best coil design and placement for your weld.
Pete Meglin, Thermatool Corp.

Controlling HF Weld Quality Part 2: Characterizing the Weld and Troubleshooting Weld Defects
The key to being able to identify and eliminate weld defects is to first understand the anatomy of an HF weld, including its metallurgy and microstructure. Once you understand what the weld defects are and what they indicate through destructive metallography and microhardness testing, you'll be able to effectively troubleshoot and resolve all your welding defects.
Lesley Frame, Thermatool Corp.

10:30 a.m. – 12:30 p.m.

NEW! F25: PRINCIPLES OF TUBE FABRICATION B

How to Implement a Flexible Bending and Fabrication System
Automated tube fabrication cells can enhance productivity and improve overall quality. Learn how to develop an automated flexible bending cell which includes other value added processes such as end-forming, assembly, flattening and forming, leak testing, and weld seam detection.
Mike Bollheimer, Wayne Trail Technologies, Inc.

B = Basic I = Intermediate A = Advanced

Modern Lubricants for Bending Tube and Pipe
With so many new synthetic lubricants available for bending tube and pipe, it can be a challenge to select the best lubrication for your operation. Each lubricant has its advantages and disadvantages. Understand how the lubricant will affect the bending, welding, cleaning, and painting process.
Joe Hough, Tower Oil & Technology Company

1:30 p.m. – 3:30 p.m.

NEW! F36: LEAN AND GREEN TUBE BENDING I

Advances in CNC Tube Bending Goes Lean and Green
While small leaps have been made, programming and machine setup continue to be bottlenecks in operation. However, all electric technology and intuitive programming have been integrated into the lean manufacturing process, reducing waste, eliminating hydraulic oil, and significantly reducing operating costs. Multiple bend operations can be consolidated into a single machine, reducing setup time to minutes and doubling productivity.
Ancel Thompson, BLM Group USA Corp.

LeanGreen Lubrication for Mandrel Tube Bending Tools
Lubricating the inside of the tube and the mandrel tooling and sometimes the wiper die surfaces have traditionally been an oily and messy process. Learn about new application and dispensing technologies that can precisely control the amount of lubricant "dosed" on to the tooling. When joined up with non liquid or gel technology, very small amounts can be used, reducing water use, chemical use and costly disposal.
William (Jeff) Jeffery, IRMCO

TUESDAY, NOVEMBER 13

8:00 a.m. – 10:00 a.m.

NEW! F46: REDUCING SCRAP ON TUBE AND PIPE MILLS I

This presentation addresses key factors that affect scrap, such as incoming material, proper end welds, mill configuration, roll designs, integrity and alignment, cooling, PM programs, proper setup, documentation, and tooling maintenance programs. Learn how to identify problems and implement corrective measures that will build morale, improve product quality, reduce scrap, and produce greater profits.
Robert Sladky and Bret Molnar, Roll-Kraft

10:30 a.m. – 12:30 p.m.

NEW! F56: TUBE MILL COOLANTS & TESTING A

Ten Tube and Pipe Mill Questions Everyone is Asking and Getting No Answers
Get the answers you need to the tough questions such as: What weld box should you use?", How do you figure strip width?, How do you prevent overlap to the seam to avoid weld splits?, How do you extend the life of your tooling?, How much wider does the strip get when it goes through the mill?, and many others!
Joe Olson, R.M.T.S.

Recent Advancements in Ultrasonic Inspection of Tubes and Pipes in Production Environments
Learn how new developments in the tube and pipe industry offer new couplant free UT inspection, high temperature, high speed inspection, and full weld, thickness, surface, and volumetric inspection that were previously out of reach with conventional piezoelectric techniques.
Borja Lopez, Innerspec Technologies

Red, White, or Black Rust: Avoiding Catastrophe When Forming Tube Of Differing Metals With One Coolant
Welded tube manufacturers are seeking to increase sales by diversifying their product portfolio by offering tubing in a variety of materials. Chemical components in mill coolants need to prevent corrosion and remain non-reactive to the specific metal substrates being formed. The complexity is further increased by possible metal-metal interaction of dissimilar alloys. Learn practical steps to avoid problems when forming different metal tubing on the same line.
Jonathan Chow, Fuchs Lubricants Co.

1:30 p.m. – 3:30 p.m.

NEW! F66: BEST PRACTICES IN HYDROFORMING B

Attendees will learn new solutions now available that offer several significant advantages, making sheet hydroforming a viable alternative for forming various metals and thicknesses over traditional metal forming methods.
Ryan Pendleton, Beckwood Press Co., Scott Pryer and Dave Smith, Triform Sheet Hydroforming

SEMINARS

W10: METALLURGY APPLIED TO EVERYDAY WELDING

MONDAY, NOVEMBER 12

8:30 a.m. – 4:30 p.m. • Room: N259

Metallurgy of welds in carbon and low-alloy steels shouldn't be complicated. This short course will help you understand how welding affects the properties of base materials, and how weld defects occur.

Who Should Attend

Owners, inspectors, engineers, and supervisors who specify welding and need to understand the interactions of base, filler, and welding processes should attend.

W11: ADVANCED VISUAL INSPECTION WORKSHOP

MONDAY, NOVEMBER 12

8:30 a.m. – 4:30 p.m. • Room: N260

An 8-hour course for CWI exam candidates to review the basic concepts and applications of visual inspection. After a discussion of the limitations and advantages of visual inspection, types of weld data that may be obtained by visual inspection are presented and discussed. Includes the many types of discontinuities encountered during the visual inspection of welds. Common tools used for visual inspection are presented and discussed (a machinist's scale, dial calipers, micrometers, fillet weld gages, the Palmgren gage, and the V-WAC). Participants will use these gages to make measurements on weld replicas. This will prepare candidates for Part "B" of the exam.

A sample weld specification containing acceptance criteria is presented and discussed, after which students use the specification and visual inspection tools to evaluate the weld replicas using a series of specific questions and scenarios.

By attending, you can learn:

- How to use weld-measuring instruments
- Compliance to a specific code
- Do's and don'ts of documentation
- When a discontinuity is OK
- When a defect is rejectable
- Why visual inspection can be the most effective NDE technique

SEMINARS

W12: API 1104 CODE CLINIC (SPANISH)

MONDAY, NOVEMBER 12

1:00 p.m. – 5:00 p.m.• Room: N253

This course will be taught in Spanish. Some written content may appear in English. The four hours of instruction provide a "road map" through the API 1104 Code, including the ability to locate important paragraphs, charts, and tables quickly, which is crucial to understanding the code when working under stressful deadlines. The instructor will illustrate the use of the code under time constraints, creating deadline pressure similar to the test environment. In addition to practice questions, a practice exam will be distributed for additional practice.

W15: ASME SECTION IX, B31.1 & B31.3 CODE CLINIC

MONDAY, NOVEMBER 12 – TUESDAY, NOVEMBER 13

8:30 a.m. – 4:30 p.m.• Room: N261

This 16-hour seminar will help you prepare for the ASME Section IX, B31.1, and B31.3 examination for endorsement or Part C of the CWI. Note that endorsements are supplemental inspection credentials available to AWS Certified Welding Inspectors (CWIs) and Senior Certified Welding Inspectors (SCWIs), but non-CWI/SCWIs can also participate in the seminar and examination to enhance their educational background. Participants are expected to provide their own codebooks. Please note that there is a separate application and fee required to take the Certification Exam.

W13: D1.1 - CODE CLINIC (SPANISH)

TUESDAY, NOVEMBER 13

8:30 a.m. – 4:30 p.m. • Room: N257

This course will be taught in Spanish. Some written content may appear in English. The eight hours of instruction provide a "road map" through the D1.1 Code, emphasizing the ability to locate important paragraphs, charts, and tables quickly, which is crucial to understanding the code when working under stressful deadlines. The instructor will illustrate the use of the code under time constraints, creating deadline pressure similar to the test environment. In addition to practice questions, a practice exam will be distributed for additional practice.

THE WHY AND HOW OF WELDING PROCEDURE SPECIFICATIONS

TUESDAY, NOVEMBER 13

W16: Beginner

8:30 a.m. – 12:00 p.m. • Room: N259

W17: Advanced

1:00 p.m. – 5:00 p.m. • Room: N259

W18: Beginner and Advanced

8:30 a.m. – 5:00 p.m. • Room: N259

Welding Procedure Specifications - Ensuring Consistent, Predictable Welding Processes Performance

As a welding professional, if you are constantly responding to customer demands for increasing the performance and quality of weldments while controlling costs, optimizing your WELDING PROCEDURE SPECIFICATIONS (WPSs) for performance and profitability may be the key. A well written WPS Defines, Measures, Analyzes, Improves, & Controls (DMAIC) quality in the welding process. This 2-part workshop revisits the fundamentals of WPSs for both the seasoned professional and for those individuals seeking to become more proficient in the authoring and application of a WPS in fabrication as well as a hands-on approach to advanced instruction in the formulation and writing of WPSs in the afternoon.

Who Should Attend

This session will benefit owners, managers, engineers, and CWIs who must qualify, write, or revise welding procedure specifications to satisfy codes and contract documents.

What Will Be Addressed?

This workshop is divided into two half-day sessions. The morning session addresses the fundamentals of WPSs. Morning topics include:

- Standard terminology
- Welding processes
- Filler metal
- Shielding gases
- Current and voltage range, travel speed and heat input
- Joint design tolerances
- Joint and surface preparation
- Preheat / interpass temperature
- Welding positions
- Standard WPSs

The afternoon session focuses on the mechanics of WPSs by different codes and standards. Afternoon topics include:

- Proper preparation and qualification of welding procedure specifications
- Documenting standard procedure qualification testing for commonly used processes for joining ferrous plate and pipe
- Selecting and documenting welding variables
    - Specifying essential and nonessential variables commonly used in sample AWS, ASME, and API code formats
    - Different techniques to author WPSs

SEMINARS

UNDERSTANDING WELDING SYMBOLS

TUESDAY, NOVEMBER 13

W19: Beginner

8:30 a.m. – 12:00 p.m. • Room: N262

W20: Advanced

1:00 p.m. – 5:00 p.m. • Room: N262

W21: Beginner and Advanced

8:30 a.m. – 5:00 p.m. • Room: N262

The first four hours of instruction that make up the Beginner portion of this course provide an overview of the updated AWS A2.4:2012 Standard Symbols for Welding, Brazing, and Nondestructive Examination. This program will review standard weld and supplementary symbols, while focusing on the development and interpretation of groove and fillet weld symbols. This course does not require any previous knowledge of welding symbols.

The next four hours of instruction that make up the Advanced portion of this course provide an overview of the updated AWS A2.4:2012 Standard Symbols for Welding, Brazing, and Nondestructive Examination. This program will focus on the development and interpretation of welding symbols for plug, slot, spot, seam, edge, stud, and surfacing welds. The course will also review brazing and non-destructive test symbols. A fundamental understanding of weld and welding symbols is required to take this course.

WELDING OF STAINLESS STEEL

TUESDAY, NOVEMBER 13

W22: Part 1 – The Basics

8:30 a.m. – 4:30 p.m. • Room: N232

WEDNESDAY, NOVEMBER 14

W23: Part 2 – Avoiding Defects

8:30 a.m. – 4:30 p.m. • Room: N260

This seminar has two independent parts: Part 1 - The Basics and Part 2 - Avoiding Defects. You can register for either day alone or for both days. The program focuses on the basic weldability of all types of stainless steels. If you need a comprehensive look at the weldability of stainless steels, particularly the 300 series, this course is for you.

Topics Covered:

- Why alloys are “stainless”
- Stainless steel differences
- Selecting a stainless for use
- Mechanical properties
- Properties after welding
- Heat treatment factors
- Selecting filler metals
- Gas vs. flux shielding
- Code requirements

You Can Learn:

- Five stainless steel types
- The effects of welding on all types of stainless steels
- Why some stainless steels require preheat and others prohibit it
- Answers to your questions about selecting and welding stainless steels

W14: D1.5 - BRIDGE CODE CLINIC

WEDNESDAY, NOVEMBER 14

8:30 a.m. – 12:00 p.m. • Room: N257

This 4-hour seminar will help you prepare for the AWS D1.5, Bridge Welding Code exam by instructing in code navigation, structure, and design. The seminar will focus on areas of the code relevant to the welding inspector, specifically clauses and sections concerning materials and design, fabrication, inspection, and qualification. Note that endorsements are supplemental inspection credentials available to AWS Certified Welding Inspectors (CWIs) and Senior Certified Welding Inspectors (SCWIs), but non-CWI/SCWIs can also participate in the seminar and examination to expand their professional credentials. Please note that there is a separate application and fee required to take the Certification Exam. Participants are expected to provide their own codebooks. AWS D1.5M/D1.5:2010 Bridge Welding Code book can be purchased at the AWS bookstore at http://pubs.aws.org/.

W25: CORROSION OF WELDS: CAUSES AND CURES

WEDNESDAY, NOVEMBER 14

8:30 a.m. – 3:00 p.m. • Room: N262

Corrosion in Welded Metallic Systems

Corrosion, resulting in the severe degradation of materials, is one of the most expensive engineering problems in our industrial society; estimates have been made that the annual cost of corrosion in the U.S. exceeds 100 billion dollars.

Welded structures are often subjected to corroding environments; in some cases, the weld and base metal corrode uniformly at the same rate. In other cases, the results are accelerated corrosion of the weld compared to the base metal, or the base metal may corrode at a much faster rate leaving the weld metal relatively intact.

A logical starting point for dealing with corrosion of welds is to define corrosion and then list the various types of corrosion that can occur, with examples. There are many different forms of corrosion recognized and various corrosion mechanisms. The most common of these will be covered in the course. Following corrosion types methods for avoidance of will be covered.

Who Should Attend

This session will benefit owners, managers, engineers, and inspectors who must monitor, inspect, prevent, and repair weldments in corrosive environments.

What Will Be Addressed?

This course will begin by addressing the fundamentals of corrosion. Other topics to be examined include:

- Pitting corrosion
- Inter-granular corrosion
- Stress corrosion cracking
- Erosion/corrosion
- Crevice corrosion
- Galvanic corrosion
- Alloying for corrosion resistance
- Corrosion protection mechanisms

CONFERENCES

W26: UNDERWATER WELDING AND CUTTING

MONDAY, NOVEMBER 12

9:00 a.m. – 3:30 p.m.• Room: N254

Conference Chair: Uwe Aschemeier

8:55 a.m. – 9:00 a.m. Welcome Remarks

Uwe Aschemeier

9:00 a.m. – 9:45 a.m. Keynote Address

Shielded Metal Arc Process for Underwater Wet Welding: Microstructure, Mechanical Properties and Integrity

Underwater wet welding offers significant cost savings over other repair techniques for submerged structures such as petroleum production platforms, ships, piers, and other maritime structures. Due to the deleterious effect of the water environment and increased pressure on weld quality, underwater wet welds are generally plagued with defects. Innovative approaches that include tailored consumable design and advanced welding process control need to be developed to quality wet welds at greater depths. Several fundamental approaches adopted to enhance the characteristics and performance of shielded metal arc (SMA) electrodes for wet welding of steel structures will be discussed in the presentation. Weld pool deoxidation, inclusion population control, porosity mitigation, and exothermic reactions are some of the selected methodologies. A delicate balance between deoxidizers and alloying agents must be developed to result in optimal weld metal composition and mechanical properties. The effects of manganese, titanium, boron, rare earth metals, and nickel will be discussed. The alloy design resulted in fine acicular ferrite microstructure in the weld metal and reheated zone and improved impact toughness. Past research showed hydrogen as the main culprit of pore formation. More recent findings, however, are able to clarify the effects of carbon and metal transfer mode on porosity (carbon monoxide formation). Careful control of the weld materials (electrode, flux, base metal) and welding process control can significantly reduce the amount of porosity in the wet welds. Recent developments clearly demonstrate that the research successes in wet welding can be transitioned to practical applications. It is possible today to perform quality wet welding on marine structures even under the strict scrutiny of fitness for service or fracture mechanics examinations. When fundamental engineering approaches are followed to investigate an engineering problem such as poor wet weld quality, successful mitigation of the problems becomes a logical outcome.

Dr. Stephen Liu, Colorado School of Mines

9:45 a.m. – 10:20 a.m.

Underwater Welding Background

This presentation describes underwater welding in regards to safety, dry and wet welding, welding processes, past structure repairs and modifications, and technical data for underwater welds. The projects are dated from 1993 to present and describe how the structures were repaired and modified. The repairs are done by welding clamps around damaged members or by replacing structural members. The modifications to the structures include installing I-tubes to tensioned leg platforms (TLPs). The presentation also provides the technical data to show that underwater welds have sufficient mechanical properties to be a viable solution to underwater repairs or modifications.

Daniel Rolstad, Technip USA

10:20 a.m. – 10:35 a.m. Morning Break

10:35 a.m. – 11:10 a.m.

Qualification of Weld Procedures for Repairs Below the Waterline

This presentation is an explanation of the American Bureau of Shipping process of qualification.

Marcus Cridland, American Bureau of Shipping

CONFERENCES

11:10 a.m. – 11:45 a.m.

Underwater Weld Repair

During a condition survey on a tanker, the rudder bottom plate and weld seams were found to be heavily corroded/eroded. In order to execute a permanent repair, welding on the rudder blade needed to be performed in a dry environment. A unique repair procedure was developed and subsequently accepted by the classification society and the owner and performed without delay. This presentation describes the underwater weld repair performed in the Bahamas while the vessel was afloat.

Uwe Aschemeier, Miami Diver LLC

11:45 a.m. – 12:45 p.m. Lunch

12:45 p.m. – 1:20 p.m.

The AWS Underwater Welding Code

Oil platforms and pipelines are built to codes and all repairs have to be made in accordance with the code. The first Specification for underwater welding was put together as a draft in the late 1960's by a group of men from the AWS, the oil companies and Chicago Bridge and Iron. The group was a subcommittee of the D3 Welding in Marine Construction. In 1974 Whitey Grubbs was appointed as the Chairman and the group was designated the D3b Sub Committee for Underwater Welding. The first specification was published as the D3.6:1983. The Specification was primarily based on D1.1 as the structures with the highest demand for repairs were built to D1.1. However, with an eye on the future there were provisions in the specification to encompass other codes such as B31.3 and API 1104. This early specification was a building block that has changed over the years as welding techniques and consumables have improved. The latest publication is AWS D3.6M:2010 and has now been upgraded from a Specification to a Code. Along with the growth of D3.6 the AWS is now in the final stages of producing a Specification for Wet Welding Electrodes for Shielded Metal Arc Welding. It is the A5.35-E1-DS2-BS.

Gregory M. Cain, Oxylance Inc.

1:20 p.m. – 1:55 p.m.

Underwater Oxy-Arc Cutting

Mandatory training and competency testing. International Association of Oil & Gas Producers (OGP) requirements. A pre-operational burning checklist is provided (Dive Management Involvement).

Jack W. Couch, Oceaneering International, Inc.

1:55 p.m. – 2:10p.m. Afternoon Break

2:10 p.m. – 2:45 p.m.

The Diver Welder: A Brief History

A short look at the evolution and performance of wet welding from the diver's perspective, specifically personal equipment and technique.

Jess Sullivan, Aqueous Corporation

2:45 p.m. – 3:20 p.m.

Water Interactive Wet Welding

One development is a gelatinous coating comprising particles of electrode coating and thermite suspended in a gel for use as an insulating coating and fluxing agent. Patents have run out on many patents. However, Andersen is available for consulting.

Leonard M. Andersen, Injected Liquid Oxygen Services

3:20 p.m. Adjournment

W30: THERMAL SPRAY BASICS: PUTTING COATINGS TO WORK

MONDAY, NOVEMBER 12

1:00 p.m. – 4:00 p.m.• Room: N256

This basic introduction to thermal spray benefits will cover four major areas: processes, equipment, applications, and industry usage.

- Processes covered will include molten metal flame spraying, powder flame spraying, wire flame spraying, ceramic rod flame spraying, ceramic rod flame spraying, detonation flame spraying, high velocity oxy/fuel spraying (HVOF), cold spraying, plasma spraying, electric are spraying, and RF plasma spraying.
- Equipment will be on display. Several spray guns will be available for attendees to handle and discuss throughout the class. Other larger items such as complex systems and spray booths will be illustrated and discussed.
- Application examples will be presented for a variety of requirements from several different industries.
- Industry usage charts will be reviewed listing several processes and coating applications used by various industries.

W27: HEALTH AND SAFETY IN THE WELDING ENVIRONMENT

TUESDAY, NOVEMBER 13

9:00 a.m. – 4:00 p.m.• Room: N253

Conference Chair: Kevin Lyttle

8:55 a.m. – 9:00 a.m. Welcome Remarks

Kevin Lyttle

9:00 a.m. – 9:35 a.m.

Welding Fumes - Practical Steps in Controlling Exposures to Hexavalent Chromium and Manganese

This talk will present data from more than 1000 air samples collected during a wide variety of welding tasks with a focus on exposures to hexavalent chromium, manganese and other metals of potential health significance. These data have been analyzed to evaluate the effect of welding process (e.g. SMAW, GMAW, GTAW, FCAW, etc.), consumables and environmental conditions to determine the circumstances that could give rise to elevated fume exposures, with a comparison to current and proposed occupational exposure limits. Studies on the efficacy and optimization of fume extractors in controlling exposures is also examined and presented. A discussion on practical steps to keep fume exposures below exposure limits while maintaining efficient productivity levels is provided.

Jeffrey Hicks, Exponent, Inc.

9:35 a.m. – 10:10 a.m.

Source Capture and PPE Solutions for Weld Fume Management

While process and behavioral changes are the prescribed first step in weld fume management, weld requirements and the processes involved may not allow for changes to be made. In these cases, companies must look at ways to capture weld fumes and to protect operators from exposure. Miller fume extraction and PPE experts will discuss source capture and Powered Air Purifying Respirator (PAPR) technologies designed to minimize or eliminate exposure to these fumes, and specific considerations companies should make when selecting a solution.

Eric Sommers and Al Hilbert, Miller Electric Mfg. Co. An ITW Co.

10:10 a.m. – 10:25 a.m. Morning Break

10:25 a.m. – 11:00 a.m.

What NESHAP Has in Store for the Welding Industry

The promulgation of the Metal Fabrication Hazardous Air Pollutant NESHAP rule for the welding industry requires additional recordkeeping, and possible changes in operations for welders. This presentation provides a step-through of the regulation starting with definitions and "Who Does this Regulation Apply To?" through "How to Comply with the Regulatory Requirements". It is a must-see for compliance managers and engineers.

Kathy Gargasz, The Lincoln Electric Co.

11:00 a.m. – 11:35 a.m.

Process Optimization Can Reduce Welding Cost and Improve the Work Environment

Understanding the interaction between the welding consumable, the shielding gas, and the output characteristics of the power supply used for GMAW, can result in a higher quality, lower cost weld while improving the work environment. Controlling the droplet transfer mechanism of the consumable by selecting the best shielding gas composition, matched with an optimized power supply wave form, can reduce weld spatter and better control weld bead shape. This minimizes post-weld grinding and surface treatments which generate high levels of noise, dust, and sometimes require the use of hazardous chemicals. Welding fume levels may also be reduced.

Kevin A. Lyttle and Philip Miller, Praxair, Inc.

11:35 a.m. – 12:45 p.m. Lunch

12:45 p.m. – 1:20 p.m.

The Guardian Fire Safety Solutions

The GuardianTM solutions reduce the risk of filter fires in the metalworking industry. Early detection and suppression are initiated in the event of a fire, to minimize the fire hazard, limit the system damage and avoid the risk of escalation and accumulation of smoke throughout your manufacturing environment. We understand the causes that lead to filter fire and, in response, have developed a fire safety system to control that risk. The GuardianTM Fire Safety Solutions are divided into three categories. Developed to prevent, detect, and suppress fire. This allows for a tailor-made solution.

The GuardianTM program contains several components which may be combined to create a system solution. Each product has its own unique features and benefits. As every factory is different, Lincoln Electric can specifically advise how to control the fire risk in your workshop. We can design a system solution, tailored to your specific welding applications and requirements.

Christopher Brodnick, The Lincoln Electric Co.

1:20 p.m. – 1:55 p.m.

Considerations for Reducing Fume Generation in the GMAW Process: Filler Metals, Welding Variables and More

As companies seek to establish safer work environments and also comply with regulatory guidelines, addressing variables in the welding application that affect fume generation is key. Selecting the proper filler metal, as well as managing material conditions appropriately can impact the overall fume generation rates for the GMAW process. Experts from Hobart Brothers and Miller Electric Mfg. Co. will discuss these factors, along with the manner in which welding variables, such as voltage, amperage and shielding gas selection can additionally affect fume generation.

Aaron Bischoff, Hobart Brothers Co.

W27: HEALTH AND SAFETY IN THE WELDING ENVIRONMENT (cont'd)

1:55 p.m. – 2:10 p.m. Afternoon Break

2:10 p.m. – 2:45 p.m.

Plasma Arc Cutting of Stainless Steel

Plasma cutting is arguably the largest producer of pollution in any facility. Laser cutting can also be of concern. In the case of lasers, the machines need a clean environment to operate at optimal levels. Whereas a plasma cutting machine can run endlessly in a heavily saturated environment, the operator running the equipment cannot; fumes will overwhelm the operator in a matter of minutes. The fumes need to be ventilated at the source of production before they can migrate elsewhere.

If you are now thinking about your thermal cutting operations and the accompanying ventilation needs, that's good. Proper ventilation is an often-overlooked aspect of metal fabricating.

Patrick Gilmour, RoboVent Products Group, Inc.

2:45 p.m. – 3:20 p.m.

Environmentally Friendly Cutting Solutions

This project sought to develop alternative environmentally friendly cutting methods and explore new methods of reducing emissions in order to comply with air operating and water discharge permit requirements at Puget Sound Naval Shipyard Intermediate Maintenance Facility (PSNS IMF). Alternate oxyfuel gas cutting gasses and equipment were investigated as well as alternate cutting processes, such as plasma arc cutting (PAC) and laser cutting. Specially designed equipment and procedures were developed for monitoring opacity during simulated demolition cutting of large plates. Submarine hull samples were obtained from PSNS IMF in both ½-in. and 2-in. thicknesses. Several plate surface conditions were evaluated, namely, clean, rusted, painted, and painted with Special Hull Treatment (SHT) tile. Most of the work was focused on OFC. Each process was evaluated using design of experiment (DOE) techniques. Evaluation of the opacity data obtained in this program included corrections for the normality of the measured data, followed by regression curve fitting, and presentation of the curve fit data in "robustness plot" format. The predicted values from the regression equations from these DOEs were then compared in the analysis. Overall, the primary finding was that opacity was strongly correlated to the amount of organic matter (e.g., paint, SHT tile residue, rust) burned. The laser cutting process was found to produce the least opacity, followed by the OFC and PAC processes. However, judgments regarding safety, cutting speed, and kerf width considerations were used to recommend a modified version of OFC in the near-term for ship dismantling at PSNS IMF.

Nick Kapustka, Edison Welding Institute

3:20 p.m. – 3:55 p.m.

Robotic Arc Welding Safety

The purpose of this presentation is to introduce the requirements for safeguarding a robotic arc welding cell. Any industrial machine must comply with the applicable regulations and consensus standards of the country where it is installed. Risk assessment is the tool to identify the hazards present in welding cell and a means to properly select the protective measures that will reduce the risk level. A robotic arc welding cell must safeguard personnel from the hazards generated by the robot, welding equipment and positioning/fixturing equipment. At the same time, these protective measures must not hinder the productivity of the cell while being fully compliant with the regulations and standards. Basic cell guarding features perimeter barriers, ventilation, interlocked access, presence sensing devices and control of hazardous energy. This is supplemented by emergency stop, awareness means and safe procedures. Specific arc welding examples will be discussed. New technology for protective measures such as safety rated software limits, safe motion control, and collaborative operation will be introduced.

Gil Dominguez, Pilz Automation Safety

4:00 p.m. Adjournment

W29: THERMAL SPRAY TECHNOLOGY: HIGH-PERFORMANCE SURFACES

TUESDAY, NOVEMBER 13

9:00 a.m. – 5:00 p.m.• Room: N255

9:00 a.m. – 9:30 a.m. Keynote

Design Considerations for Thermal Spray Coatings

Thermal Spraying is certainly a specialized process, but the end result (coating) has played a significant role in everyday industrial and commercial products around the globe. Coatings are used to change surface properties, improve product performance, extend service life and reclaim worn components back into service. A successful business model today must develop, test and bring to market a new product on a precise time line leaving little room for poor performance or re-engineering activity. This presentation will review some of the common design considerations needed for selecting a thermal spray coating and provide some typical examples of success and failure in the design process.

Raymond J. Sinatra, Rolls Royce Corporation

9:30 a.m. – 9:50 a.m.

Cost Implications of Cascaded High Efficiency Plasma Spray Processes

Plasma spray coating costs are highly dependent on the rate of material deposition. As a consequence the power of plasma spray systems introduced into the market has consistently increased with time as a means of increasing deposition rates. Cascaded plasma spray technology

has more recently shown the ability to increase deposition rates through increases in efficiency. Examples will show that by using material more efficiently and consuming less energy and other utilities, the cost of coating application can be significantly reduced.

Omar Sabouni, Sulzer Metco

9:50 a.m. – 10:10 a.m.

Experimental Investigation of Ultra-Smooth Hardface Coatings Applied by Advanced HVOF Process

Many industrial applications, such as landing gear, compressor blades, valves and gates, require the surface properties of high hardness, superior finishing and strong adhesion to provide satisfactory wear and erosion resistance and mechanical integrity. In this work, an improved HVOF process is developed and investigated for applying hardface coatings with near-net-shape and ultra smooth as-sprayed surface compared to those fabricated by a conventional HVOF process. This would provide a significant step forward in streamlining the manufacturing process and potentially cost.

Xinqing Ma, Curtiss-Wright Surface Technologies

10:10 a.m. – 10:30 a.m.

Noise Abatement and Safety for HVAF and Cold Spray

Cold Spray, HVAF and Other High Noise Level Technologies Require New Approaches to Sound Abatement Safety. With the introduction of new technologies to thermal spray such as cold spray and High Velocity Air Fuel (HVAF), advanced noise abatement equipment and new techniques for sound control are necessary to protect worker safety. Both of these processes produce high levels of high frequency noise. High frequency noise presents unique challenges from a sound containment perspective. A basic technical discussion of sound wave profiles and how they relate to thermal spray will be included. New technologies for spray booth design which have been developed for cold spray and HVAF in order to keep noise levels at or below 85 DBA will be detailed. Special consideration must be given to wall panels, doors, windows and other opening such as overhead roof hatch access for cranes. The paper will also review basic noise safety considerations and noise abatement techniques for established processes including HVOF, plasma arc spray, electric wire arc and D-Gun™.

Scott McLaughlin, McLaughlin & Associates
Thermal Spray, Inc.

10:30 a.m. – 10:50 a.m. Morning Break

10:50 a.m. – 11:10 a.m.

New Safety Control Methods to Meet the Global Needs of a Modern Thermal Spray Industry

Each day an industry grows, its safety considerations become more and more prevalent. In thermal spray, we have the unique opportunity to be able to include factors from discrete points of concern in an easily defined safety protocol. This paper outlines the ways in which the modern development of robotic control systems provides an ideal platform to support a single-point, elegant logic process of managing a safety matrix practically unlimited in size. A thorough, well-established foundation using up-to-date technology is the only way to ensure that safety remains the number one priority.

Alex Thornton, Hardface Alloys, Inc.

11:10 a.m. – 11:30 a.m.

Quality Thermal Spray

Thermal spray as a whole is one operation, but a closer look reveals more than one step to insuring a quality outcome. This presentation will show how AWI has evolved as we understand and focus in on the quality that each step provides to the end product. As in all repair processes there are many variables that can contribute to the end product. How we control and minimize mistakes with these variables is what makes our company a leader in the industry.

Jory Wright, Accuwright Industries

11:30 a.m. – 11:50 a.m.

Performance Comparison of Standard and Modified NiCrMo Alloy C HVOF Coatings, and Their Use as Alloy Matrix for Tungsten Carbide Composites

NiCrMo alloys are commonly used for their exceptional resistance to highly corrosive service environments in the paper processing, chemical, petrochemical, and other industries. Corrosion there can be a significant, costly and time-consuming maintenance problem. Here, HVOF coatings of a modified Alloy C are compared with those of conventional Alloy C. The modified alloy exhibits significantly improved corrosion resistance and grind finishability over the conventional alloy. The addition of carbides, such as tungsten carbide, to improve wear performance is also discussed. Current and potential applications are also presented.

Robert A. Miller, Kennametal Stellite

W29: THERMAL SPRAY TECHNOLOGY: HIGH-PERFORMANCE SURFACES (cont'd)

11:50 a.m. – 12:10 p.m.

Thermal Spray and the Starving Artist

Many artists and art restorers have developed or restored works that benefit from the unique properties provided by Thermal Spray operations. The Thermal Spray system of the artist may differ significantly from the system of a standard job-shop. For example, artists are usually not concerned with high production rates, automation and specialty coatings such as thermal barrier coatings and tungsten-carbide coatings. On the other hand, artists and art restorers are interested in systems that can lay down a fine, precise coating with good accuracy, one that is versatile, able to handle a variety of materials, and, as indicated by the title, one that fits within the budget of a starving artist. This paper presents a review of Thermal Spray in the world of art, discusses the various ways that Thermal Spray is being used for art and covers the requirements for a system specifically configured for the artist and the art restorer.

Dale Moody, Plasma Powders and Systems

12:10 p.m. – 12:30 p.m.

Make or Buy, Determining the Total Costs of Operating a Thermal Spray Facility

Whether they feel deliveries aren't fast enough, or the price for the product seems unnecessarily high, many regular consumers of thermal sprayed coatings consider the option of developing their own captive thermal spray capacity. Some even go so far as to get quotations for a gun or two and are encouraged enough to pursue the issue further. Very few, however, complete the project and take the process in-house. This presentation will discuss the fundamental requirements for a basic commercial thermal spray facility and the costs involved, in order to establish a realistic hurdle an OEM might need to meet in order to justify bringing thermal spray coating operations under their roof.

Daniel C. Hayden, Hayden Corporation

12:30 p.m. – 1:30 p.m. Lunch

1:30 p.m. – 1:50 p.m.

Thermal Spray Methods and Equipment – 1800s Through the 1930s

Many people, when first learning about the thermal spray method, are often quite shocked when they are told that this method of applying coatings has been in use for over 100 years. While we in the thermal spray industry tend to focus on the latest thermal spray equipment technology, it is quite interesting to look back at the discoveries and application methods of the past. It is fascinating to see how far we have come and yet how close we still are to the roots and origins of thermal spray. This informative paper will discuss these early methods and compare them to some of their modern counterparts. Along with this paper there will be some actual examples of antique thermal spray equipment displayed.

James Weber, Sulzer Chemtech USA

1:50 p.m. – 2:10 p.m.

Modeling of a Controller for a Thermal Spraying System

There are a number of thermal spraying systems, which are based on High Velocity Air Flame (HVAF) processes. Stable control of HVAF systems is difficult to achieve due to the complexity of the combustion process in a small burner and because of a number of varying process parameters. Therefore, modeling of a control of HVAF systems can provide useful information in optimizing the performance of a thermal spraying system. In this research, a basic model of a HVAF controller has been developed using Matlab/Simulink. The control model consists of sub-models of various stages and units of the control system, such as: air and fuel supply models, combustion model, burner and nozzle models. The developed model was applied and evaluated using a thermal spraying controller, which was developed previously. The obtained results indicate that the developed simplified model of HVAF controller provides the main required control parameter, the fuel-air ratio, which corresponds with the value used in the actual control of the thermal spraying system.

Igor Gorlach, Nelson Mandela Metropolitan University

2:10 p.m. – 2:30 p.m.

Robotic Laser Cladding

A laser cladding system concept with similarities to thermal spray equipment solutions will be presented, combining a high-power laser, powder feeding equipment and a robot handling with a dedicated laser cladding system controller in a laser-safe housing.

Thomas Peters, Sulzer Metco AG

2:30 p.m. – 2:50 p.m.

Thermal Spray Lubricious Coatings

During the extreme conditions experienced in automotive and aerospace applications, oil-based lubricants break down at high temperatures. Under such conditions, conventional fluid lubricants either fail early or never are considered as an option. As a result, components of engines that are run at high temperatures to improve their fuel efficiency tend to wear rapidly and require replacement. One solution to extend bearing life is with the implementation of a low friction, high temperature stable, and low wear coatings to the component surface that can perform under extreme conditions. Solid lubricant coatings offer a solution for diverse applications exhibiting extreme and difficult running conditions. Although the most common dry-solid lubricants

are graphite, MoS2, WS2, TaS2, and PTFE, they are limited in terms of their high temperature capabilities as well as their wear characteristics. Hence in this paper we propose novel thermal spray lubricious hard coatings. Different combinations of the plasma and HVOF sprayed Chrome carbide and lubricant materials are chosen and their composition, microstructure and high temperature wear characteristics are presented.

Satish Dixit, Plasma Technology

2:50 p.m. – 3:10 p.m. Afternoon Break

3:10 p.m. – 3:30 p.m.

Corrosion and Protection Offered by a Dispersed Oxide Coating System

It has been well documented that the use of municipal waste as fuel to produce steam in Waste-to-Energy (WTE) boilers causes severe corrosion on the internal surfaces in these environments. The current remedy for such corrosion problems has been the use of weld overlays containing Nickel and the oxide forming elements such as Aluminum and Chromium. Although in the past, weld overlays have proven beneficial in halting such corrosion, it now appears that the current operating conditions coupled with unique maintenance practices have placed exceedingly difficult demands on the weld overlay's ability to mitigate corrosion. This paper, in cooperation with an industry leading producer of electricity using municipal waste as their primary fuel, will detail a two year corrosion study performed at a WTE facility known for its excessive corrosion problems. This study will present the operating conditions, maintenance practices, and the coating application technology used. The results of this study has provided us with insights on the many different scenarios that are capable of causing corrosion and the protection that is offered by a Dispersed Oxide coating system.

David J. Urevich, ArcMelt Company

3:30 p.m. – 3:50 p.m.

A New Arc Spray Amorphous Alloy for Wear Applications

Cored wire technology for thermal spraying allows the use of unique alloys that are not available in solid wire form. This paper discussed new developments in cored wires for thermal spraying including amorphous, nano and self fluxing alloys. A discussion of successful applications for these alloys is included.

Bob Unger, Polymet Corporation

3:50 p.m. – 4:10 p.m.

Capability of Combined Thermal Spray and Laser Coating Centers to Improve Production Efficiency

Novel coating centers permit control of both thermal spray and laser based surface treatment processes. Laser cladding production rates and efficiencies can be improved with the incorporation of substrate and feed stock material preheating techniques. The benefit of these techniques to the basic laser cladding process are presented and evaluated in relation to their impact on industrial production. Industrial applications including, hydraulic pistons, excavation tools, ball valves, drive shafts, continuous casting copper molds and pot rolls for continuous galvanizing lines in steel mills, are used to demonstrate this modified laser cladding processes in combination with thermal spray processes.

Alan Burgess, SprayWerx Technologies

4:10 p.m. – 4:30 p.m.

Recent Advances in Materials and New Industries Entering the Thermal Spray Field – Thermal Spray Equipment for Use in These Industries and Applications

Advances in materials along with newer industries joining the thermal spray field occur every several years. This talk will briefly discuss the class of ultrafine and near-nano grained materials entering the thermal spray industry. Thermal sprayed coatings produced from ultrafine and near-nano grained powders provide improved properties as compared to conventional (micron size) powders. These materials show significant potential for many industry applications (aerospace, oil & gas, industrial gas turbine). Sintered (SPS) ultrafine and near-nano light alloys (Al-, titanium-based) will be discussed as well as high velocity oxygen-fuel (HVOF) sprayed WC-Co-Cr and WC-Co carbides. Several industries have made a notable contribution to the thermal spray industry over the past several years. A brief review of one of these, the electronics industry entering the thermal spray industry will be discussed.

And lastly, with the advancements in materials and industries, we see the advancements in equipment(s) and operations in supporting the higher requirements required by these industries. This ranges from mass-flow controlled equipment- to robotics, to vacuum plasma spray chamber usage in solar, electronics, and semiconductor applications to meet high purity (e.g., low oxygen, phase stability) requirements of these coatings.

Robert Gansert, Advanced Materials and Technology Services

4:30 p.m. – 5:00 p.m. Q&A

5:00 p.m. Adjournment

CONFERENCES

W28: TRENDS IN NONDESTRUCTIVE EXAMINATION

WEDNESDAY, NOVEMBER 14

9:00 a.m. – 3:30 p.m.• Room: N255

Conference Chair: Michael Moles

8:55 a.m. – 9:00 a.m. Welcome Remarks

Michael Moles

9:00 a.m. – 9:35 a.m.

Nonlinear Ultrasonics: A Practical Prognostic Tool for Fatigue Damage Assessment

The values of ultrasonic nonlinearity parameter measured with the second harmonic generation technique have been correlated to microstructural damages of various types of solid materials by many researchers. Accumulated fatigue damage, creep, plastic deformations are a few to mention. Years of research and development efforts with funding from the power generation industry turned what was once a rack-full of laboratory system into a portable fatigue damage measurement system. The current prognostic system is consisted of a probe assembly and an industrial grade computer with custom-designed signal processing cards. Examples of field-collected data will be presented and surface acoustic waves, and eddy current.

Jeong K. Na, Edison Welding Institute

9:35 a.m. – 10:10 a.m.

ASME Code Compliant Phased Array Weld Inspections

ASME (the American Society for Mechanical Engineers) published a full series of Mandatory AUT (Automated Ultrasonic Testing) and Phased Array (PA) Appendices in Section V (NDE) in July 2010. These now cover most aspects of advanced ultrasonic inspection (adding in TOFD in another Mandatory Appendix), and are specifically aimed at boiler and piping inspections. The three new AUT Appendices essentially replace the old Code Case 2235, but are significantly easier to read and understand; however, they do not include acceptance criteria as these will be developed in other ASME reference Sections. The two new PA Appendices are re-packaged versions of the initial five Code Cases, and cover the same technical ground. This presentation will briefly describe the five new Mandatory Appendices, and their implications. While ASME was initially developed for the USA, it is now a globally used Code, and Section V is often referenced for in-service inspections as well. As such, ASME Boiler and Pressure Vessel Code is significantly more important than just for construction welding.

Michael Moles, Olympus NDT

10:10 a.m. – 10:25 a.m. Morning Break

10:25 a.m. – 11:00 a.m.

Time of Flight Diffraction (TOFD)

TOFD is a powerful NDE tool for fabrication. It can be used as a quick, reliable and effective screening process for a variety of flaw types for code acceptance and quality control. This dual level code criteria assessment and Quality Control feedback process has the potential to shift the focus from ECA-derived acceptance criteria of larger flaws and costly repairs to the delivery of quality welds.

John R. Lilley, Sonomatic

11:00 a.m. – 11:35 a.m.

Introduction to Computed Radiography

This talk will be an introduction of the Computed Radiography technique and its basic principles of operation. Also discussed will be the ASME Code Rules for use and Code Acceptance of the technique.

Brian Laite, Chicago Bridge & Iron Co.

11:35 a.m. – 12:45 p.m. Lunch

12:45 p.m. -1:20 p.m.

Workflow Guided Ultrasonic Inspection of Welds on Fabricated Pipe

The presentation will include demonstration of an application wizard to generate inspection set-up parameters, simulation of a typical menu directed weld inspection, and discussion on leveraging the capabilities of inspection personnel for inspection plan creation, data acquisition, review, and analysis.

Dave Jankowski, GE Measurement & Control

1:20 p.m. – 1:55 p.m.

The Benefits of Using Phased Array in Lieu of Radiography

This presentation will detail the benefits of phased array over film RT, the ability to perform inspections at elevated temperatures if needed, i.e., during interpass stages of welding and show the overall end product.

David Bajula, Acuren Inspection Inc.

1:55 p.m. – 2:10 p.m. Afternoon Break

2:10 p.m. – 2:45 p.m.

Advanced Weld Inspections using Phased Arrays

Advanced phased array units are used in a number of applications, such as austenitic welds, pipeline welds, and pipe mills. These units are based on the same principles as the more portable instruments, but typically have advanced features built in: advanced Focal law calculators, capability for dual arrays, high speed data processing, and specialized algorithms. The devices are based on either the Focus LT, or on QuickScan PA, and offer significant flexibility in beam angles and other features.

Michael Moles, Olympus NDT

2:45 p.m. – 3:20 p.m.

Inspection of Submerged-Arc Welded Pipes Using an Automated Phased Array Ultrasonic System

This presentation will detail a leading longitudinal SAW pipe manufacturer's experience with an automated phased array ultrasonic system. Longitudinal and helically welded submerged- arc welded (SAW) pipes are used for pipeline construction around the world. Certain industrial standards (for example API Specification 5L) require that these pipes are inspected using the ultrasonic non-destructive test method. Conventional (non-phased array) ultrasonic systems for SAW pipe testing traditionally use ultrasonic sensors with fixed incident angles. The incident angles are selected based primarily on the pipe wall thickness. With a fixed incident angle the range of ultrasonic adjustments and the ability to optimize the system to various artificial and natural weld reflectors is somewhat limited. The introduction of a phased array ultrasonic SAW pipe testing system has greatly increased the ability for the inspector to optimize the system to adapt to various inspection requirements. Multiple ultrasonic "shots" can be defined in a cycle table with parameters such as incident angle and focal length changing from shot to shot. Use of a sector scan during system setup reduces the time required for optimization. Because of the flexibility to vary incident angle and focal length for any sensor, the phased array system utilizes fewer individual sensors. Due to this, the complexity of the test mechanics and the setup time is reduced considerably.

Ronald B. Peoples, GE Measurement & Control

3:20 p.m. Adjournment

RWMA RESISTANCE WELDING SCHOOL

The two-day resistance welding school is sponsored by the American Welding Society and the Resistance Welding Manufacturing Alliance, and conducted by industry specialists. The basics of resistance welding and real-life application of the process are covered. Participants learn at their own pace and discuss specific welding concerns with the instructors. You are invited to bring your own samples for discussion.

Please plan to be present for both days of the school. The program is limited to 100 students. In addition, there will be tabletop exhibits both days, demonstrating the latest resistance welding products offered by RWMA-member companies. The registration fee includes: a copy of the Resistance Welding Manual, Revised Fourth Edition (a $125 value) and a course binder containing all instructor presentations.

Room: N239/241 • *Registration Code: W31*

TUESDAY, NOVEMBER 13

7:45 a.m. – 8:00 a.m.

Welcome and Introduction to Resistance Welding

Bill Brafford, Tuffaloy Products, Inc.

8:00 a.m. – 8:30 a.m.

Basics of Resistance Welding Video – Part I

8:30 a.m. – 11:00 a.m.

Electrodes and Tooling

Focus on the classification, selection and maintenance of electrodes and fixtures as they pertain to numerous applications. By revealing some problem-solving techniques and suggestions, Bill will familiarize you with some powerful problem/evaluation/solution techniques that will keep your production process running longer– and operation more efficient.

Bill Brafford, Tuffaloy Products, Inc.

11:15 a.m. – 12:15 p.m. Tabletop Exhibits

12:15 p.m. – 12:45 p.m. Lunch Served

12:45 p.m. – 2:45 p.m.

Welding Controls

This discussion focuses on the selection, descriptions, and applications of welding timers, contactors, and accessories. Packed with a punch, Don Drives home $H=I^2RT$ in a way you'll never forget. He shows you how this invaluable formula is used in every resistance welding application– every day–every cycle–all the time!

Don Sorenson, ENTRON Controls, LLC.

3:00 p.m. – 5:30 p.m.

Electrical Power Systems

This session reviews the descriptions and maintenance of electrical power components and conductors from the weld control to the electrode. This lively presentation has something for everybody. Utilizing several small demonstrations, Mark helps you understand this very important part of the resistance welding process which will keep you on the edge of your seat!

Mark Siehling, RoMan Manufacturing Inc.

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 10:00 a.m.

Welding Processes & Machines

This session will reinforce the very essence of how the resistance welding process works and how the process relates to each of the four resistance welding processes. This session will be full of application examples from each process and how machinery utilizes the individual components and elements illustrated in the other sessions.

Tim Foley, Automation International, Inc.

RWMA RESISTANCE WELDING SCHOOL (cont'd)

10:15 a.m. – 10:45 a.m.

Basics of Resistance Welding Video – Part II

10:45 a.m. – 12:00 p.m.

Troubleshooting and Maintenance

With over 30 years' experience in the auto industry, specifying, installing and troubleshooting resistance welding systems, Bruce will give you tips on how to find the reasons why welds don't turn out the way you would like. This presentation is filled with real-life examples of problems that baffled maintenance persons.

Bruce Kelly, Kelly Welding Solutions

12:00 p.m. – 1:15 p.m. Lunch Served

1:15 p.m. – 3:15 p.m.

Initial Machine Set-Up

Robert takes you through the selection and maintenance procedures of proper weld schedules and preventive maintenance programs designed to make your resistance welding operations profitable. Hands-on demonstrations peak this presentation

Robert Matteson,
Taylor–Winfield Technologies, Inc.

3:15 p.m. – 3:45 p.m.

Question and Answer Session

PROFESSIONAL PROGRAM

Pick and choose between concurrent sessions for the latest in welding research and commercial developments. Pay by the day or attend the entire three-day program, with special discounts for students and members of AWS, FMA, SME, PMA, or CCAI.

3-Day Professional Program – *Registration Code: W35*

3-Day Student Professional Program – *Registration Code: W36*

1-Day Professional Program – *Registration Code: Monday W32, Tuesday W33, Wednesday W34*

MONDAY, NOVEMBER 12

1:30 p.m. – 5:30 p.m. • Room: N238

SESSION 1: INDUSTRY/UNIVERSITY COLLABORATIVE RESEARCH CENTER ON INTEGRATED MATERIALS JOINING SCIENCE FOR ENERGY APPLICATIONS – WELDING METALLURGY

Chair: John N. DuPont, Lehigh University

1A. 1:30 p.m. Precipitate Evolution in 2.25 Cr- 1Mo Steel Welds

Soumya Mohan, Sudarsanam Suresh Babu, The Ohio State University, Teresa Melfi, Badri Narayanan and Ben Schaeffer, The Lincoln Electric Company

1B. 2:00 p.m. Stress Rupture Evaluation of Steel Welding Consumables

Xiao Chai, University of Wisconsin-Madison, J. Bundy, Hobart Brothers, and S. Babu, The Ohio State University

1C. 2:30 p.m. Comparison of Nb, Hf, and Ta as Eutectic in Ni Welds

Adam Hope, The Ohio State University, Steve L. McCracken, Electric Power Research Insitute, and John C. Lippold, The Ohio State University

1D. 3:00 p.m. Heat Treatment Response of Candidate Nickel-Base Superalloys for Advanced Supercritical Coal-fired Power Plants

David Tung and John C Lippold, The Ohio State University

1E. 3:30 p.m. Corrosion Fatigue Behavior of Ni-based Coatings

Andrew Stockdale and John N. DuPont, Lehigh University

1F. 4:00 p.m. Metallurgical Characterization of High Strength Alloys

Tiffany Yan-Tung Ngan, Boian T. Alexandrov and John C. Lippold, The Ohio State University

1G. 4:30 p.m. Metallurgy of Thermally Simulated Eglin Steel

Brett Leister and John N. DuPont, Lehigh University

1H. 5:00 p.m. Post Weld Heat Treatment Response of 2.25Cr-1Mo Steel

David Hodgson, Benjamin Sutton, Eric Fusner and John C. Lippold, The Ohio State University

1:30 p.m. – 5:30 p.m. • Room: N240

SESSION 2: ARC WELDING STUDIES

Chair: YuMing Zhang, University of Kentucky

2A. 1:30 p.m. Pulse GMA Welding Characteristics of 5083 Al Alloy - Effect of Shield Gas Composition and Welding Conditions

Kibae Lee and Cheolhee Kim, KITECH

2B. 2:00 p.m. A Study of the Optimum AVC Parameter on the Orbital GTAW Welding Equipment

Kwang-deok Choi, Sang-hun Ryu, Hee-joon Sung and Kyeong-ju Kim, Hyundai Heavy Industries

2C. 2:30 p.m. Improvement of GTAW Using Arcing-Wire

Jinsong Chen, Yi Lu, Xiangrong Li and YuMing Zhang, Adaptive Intelligent Systems LLC

2D. 3:00 p.m. Design and Fabrication of Low-Pass Filters and Analysis of High Frequency Noise and Process Noise in the Signals of the Voltage and Current for Process-Integrated Quality Assurance in Pulse GMA Welding

S. Rajasekaran and R. Umarani, El-Shaddai Welding and Cutting Consultants

2E. 3:30 p.m. Interval Model Control for Manual Plasma Pipe Welding

YuMing Zhang and Xiangrong Li, Adaptive Intelligent Systems LLC

2F. 4:00 p.m. Penetration Monitoring and Control System for SAW

Xiangrong Li and YuMing Zhang, Adaptive Intelligent Systems LLC, and Lee Kvidahl, Huntington Ingalls Industries

2G. 4:30 p.m. Dynamic Analysis of Active Droplet Oscillation in GMAW

YuMing Zhang, University of Kentucky

2H. 5:00 p.m. Nonlinear Neuro-fuzzy Modeling of Welder's Response

YuKang Liu, Weijie Zhang and YuMing Zhang, University of Kentucky

1:30 p.m. – 5:30 p.m. • Room: N242

SESSION 3: WELD MICROSTRUCTURE AND PROPERTIES

Chair: Suresh Babu, The Ohio State University

3A. 1:30 p.m. Dissimilar Metal Welding of Nitronic 50HS™ and 25% Cr Super Duplex Stainless Steel (SDSS)

Fredrick Noecker II and Caleb Roepke, ExxonMobil Development Company, Morgan Gallagher, Edison Welding Institute, and Martin Hukle, Trendsetter Engineering Inc.

3B. 2:00 p.m. Sources of Variation in FN Predictions vs Measurements

Damian Kotecki, Consultant, and Zhuyao Zhang, Metrode Products Ltd.

3C. 2:30 p.m. High-Strength FCAW Electrode Study With Lower Manganese

Stanley Ferree and Michael Sierdzinski, ESAB Welding & Cutting Products

3D. 3:00 p.m. Influence of Dilution on Pitting Corrosion Resistance

Su-Kil Park, Young-Il Kim, Sang-Deuk Bae and Jun-Tae Choi, Hyundai Heavy Industries

3E. 3:30 p.m. A Robustness Design on SS-FCAW Based on Alloying and Microstructure Optimization

Wesley Wang, ESAB Welding & Cutting Products

3F. 4:00 p.m. Fabrication and Welding of Corrosion Resistant Pipeline

Borja Saiz Sanchez, Nuevas Tecnologias de Soldadura SL (Newtesol)

3G. 4:30 p.m. Effect of Friction Stir Welding on Fatigue Crack Propagation in API 5L X80 (ISO 3183 X80M) Pipeline Steel

Jeffrey Sowards, David McColskey and James R. Fekete, National Institute of Standards and Technology, and Antonio J. Ramirez, Laboratório Nacional de Luz Síncrotron

3H. 5:00 p.m. Oxygen Effect in the Bainittic-type GMAW Weld Metals

Hee Jin Kim, KITECH, and Jun Seok Seo and Changhee Lee, Hanyang University

TUESDAY, NOVEMBER 13

8:00 a.m. – 9:00 a.m. • Room: N238

SESSION 4: KEYNOTE ADDRESS: DR. PETER MAYR

Chair: John N. DuPont, Lehigh University

4A. 8:00 a.m. Keynote: Current Status of Welding and Joining Research in Germany

Prof. Dr. Peter Mayr, Chemnitz University of Technology

9:00 a.m. – 12:00 p.m. • Room: N238

SESSION 5: INDUSTRY/UNIVERSITY COLLABORATIVE RESEARCH CENTER ON INTEGRATED MATERIALS JOINING SCIENCE FOR ENERGY APPLICATIONS – MODELING

Chair: Dave Farson, The Ohio State University

5A. 9:00 a.m. Computational Thermodynamic Models of Weld Microstructure

Bo Wang and Sindo Kou, University of Wisconsin-Madison and Fang Zhang, CompuTherm LLC

5B. 9:30 a.m. Modeling of Process and Microstructure in IN718 Laser Deposition

Yousub Lee, Dave Farson and Suresh Babu, The Ohio State University

5C. 10:00 a.m. Real Time In-Situ Vision Analysis of GMAW Weld Pool

Miguel Calvo Gaztaaga, Andrew Neill and John Steele, Colorado School of Mines

5D. 10:30 a.m. Microstructure Evolution During Metal Deposition

Kurt Makiewicz and Suresh Babu, The Ohio State University, Anil Chaudhary and Matt Keller, Applied Optimization

5E. 11:00 a.m. Characterization of Robotic Gas Metal Arc Welding

Andrewl Neill and John Steele, Colorado School of Mines

5F. 11:30 a.m. Variations in Nitrogen Content and Porosity Formation in Deep Penetration Laser Welds of Nitronic-40 Stainless Steel Alloys

David Z. Pan, Dave Farson and Suresh Babu, The Ohio State University

8:00 a.m. – 12:00 p.m. • Room: N240

SESSION 6: FRICTION STIR WELDING & SOLID STATE PROCESSES

Chair: Maria Posada, Naval Surface Warface Center, Carderock Division

6A. 9:00 a.m. High Frequency Welding of Bridge Steels

Yoni Adonyi, L. Frame and J. Ocel, LeTourneau University

6B. 9:30 a.m. Combating and Sensing Tool Wear in FSW of MMCs

Tracie Prater, Alvin Strauss, George E. Cook, Brian Gibson and Chase Cox, Vanderbilt University

6C. 10:00 a.m. Thermal Profiles During FSW of Ti-6Al-4V Alloy

Xiuli Feng and Suresh Babu, The Ohio State University, Huijie Liu, Harbin Institute of Technology, Anil Chaudhary and Matt Keller, Applied Optimization

6D. 10:30 a.m. Microsampling of Friction Stir Processed 5XXX Al Alloys

Caroline Scheck and Kim Tran, Naval Surface Warface Center, Carderock Division

6E. 11:00 a.m. Friction Stir Spot Welding With a Rotating Anvil

Chase Cox, David R. DeLapp, George E. Cook and Alvin M. Strauss, Vanderbilt University

8:00 a.m. – 12:00 p.m. • Room: N242

SESSION 7: WELDING METALLURGY

Chair: Leijun Li, Utah State University

7A. 9:00 a.m. Sigma Phase Precipitation In UNS S32707 and UNS SS33207

Doris Ivette Villalobos Vera and John C. Lippold, The Ohio State University

7B. 9:30 a.m. HAZ Recrystallization in Forged 304L Stainless

Lisa Deibler, Arthur A. Brown, Joseph D. Puskar and Christopher W. San Marchi, Sandia National Laboratories

7C. 10:00 a.m. Phase Transformations in Ni-base Superalloy 282

Boian Alexandrov, Jeffrey M. Rodelas, Margaret R. Kitilla, and John C. Lippold, The Ohio State University, and David A. Metzler, Haynes International

7D. 10:30 a.m. Effect of Post-Weld Heat Treatment on Toughness of Heat-Affected Zone of Grade 91 Steel

Leijun Li, Bishal Silwal and Andrew Deceuster, Utah State University

7E. 11:00 a.m. Modeling of Pore Shape in Welding

Peng-Sheng Wei and S.Y. Hsiao, National Sun Yat-Sen

7F. 11:30 a.m. Wetting Mechanism in Steel-Ni-Mg Alloy Reactive System During Laser Brazing Process

A.M. Nasiri, D.C. Weckman and Y. Zhou, University of Waterloo

2:00 p.m. – 5:00 p.m. • Room: N238

SESSION 8: SENSING APPLICATIONS

Chair: Zhili Feng, Oak Ridge National Laboratory

8A. 2:00 p.m. Automatic Welding Heat Input Measuring System

Young-Eun Ji, Myeong-Jae Jang, Hyeong-Soon Moon and Ji-On Kim, Hyundai Heavy Industries

8B. 2:30 p.m. Adaptive Control Reduces Weld Puddle in Orbital Welding

Xiangrong Li, Adaptive Intelligent Systems LLC

8C. 3:00 p.m. Resistance Spot Welding Real-Time Inspection System Based on Infrared Thermography

Jian Chen, Wei Zhang and Zhili Feng, Oak Ridge National Lab

8D. 3:30 p.m. Sensory Helmet for Observation of Weld Pool Surface

Weijie Zhang and YuMing Zhang, University of Kentucky

8E. 4:00 p.m. Non-contact Measurement of Temperature and Strain During Welding

Wei Zhang, Jian Chen and Zhili Feng, Oak Ridge National Lab, Eric Willis and Ken Wolfe, Electric Power Research Insitute

8F. 4:30 p.m. Automatic Robot System for Horizontal Position of Welding in Ship Building

Sung Hoon Ko, Hyeong Soon Moon and Jeom Goo Kim, Hyundai Heavy Industries

8G. 5:00 p.m. Better Monitoring of Welding on Tube Mills

Cameron Serles, Xiris Automation Inc.

2:00 p.m. – 5:30 p.m. • Room: N240

SESSION 9: INDUSTRY/UNIVERSITY COLLABORATIVE RESEARCH CENTER ON INTEGRATED MATERIALS JOINING SCIENCE FOR ENERGY APPLICATIONS – WELDABILITY

Chair: Boian T. Alexandrov, The Ohio State University

9A. 2:00 p.m. Design of Filler Metals for Wide Gap Brazing of Nickel-based Superalloys with Enhanced Ductility and Resistance Against Low Cycle Fatigue

Scott Nelson, Juan Carlos Madeni and Stephen Liu, Colorado School of Mines, Srikanth Kottilingam and David Schick, GE Energy

9B. 2:30 p.m. Mitigating Heat Affected Zone Softening of Advanced High Strength Steels with Laser Welding

Brian Hanhold, Suresh Babu and Tapasvi Lolla, The Ohio State University, and Gary Cola, SFP Works LLC.

9C. 3:00 p.m. Solidification Behavior of Laser Welded 21-6-9 Stainless Steel

Stephen Tate and Stephen Liu, Colorado School of Mines, and Pat Hochanadel, Los Alamos National Laboratory

9D. 3:30 p.m. Heat Treatment of Al/Cu Builds Made with VHP UAM

Adam Truog and Suresh Babu, The Ohio State University

9E. 4:00 p.m. Creep Behavior of Inconel 740 Welds

Daniel Bechetti and John N. DuPont, Lehigh University

9F. 4:30 p.m. Microstructural Investigation of Laser Cladding Builds

Yuan Tian, Suresh Babu and Dave Farson, The Ohio State University

9G. 5:00 p.m. Effect of LTTW on Weld Distortion and Residual Stress Control - Experimental Verification and Numerical Modeling

Sindhu Thomas, Tariq Al-Ghamdi and Stephen Liu, Colorado School of Mines, and Zhili Feng, Oak Ridge National Laboratory

2:00 p.m. – 5:30 p.m. • Room: N242

SESSION 10: APPLIED TECHNOLOGY

Chair: Murali Tumuluru, United States Steel Corporation

10A. 2:00 p.m. Back to the Future: Technological Innovation in Oxyfuel

Telma Keppler, DVS - Germany

10B. 2:30 p.m. Evaluation of Welding Wire Finishing

Kai Boockmann, Michaela Boockmann, Gerhard Boockmann and Richard Fichtner, Boockmann GmbH

10C. 3:00 p.m. Piping Erection Practice by FCAW-GS in Oil & Gas Industry

Atsushi Takahashi, Yoji Ogata and Kosuke Nishimura, JGC Corporation, EN Technology Center, Kazuhiko Ito, Kobe Steel, Ltd., and Yasuyuki Yokota, Kobelco Welding of America, Inc.

10D. 3:30 p.m. A Revolution in Weld Quality Management Using a Laser Inspection System

Jeffrey Noruk, Servo Robot Corp

10E. 4:00 p.m. Weld Fume Mitigation: Evaluating Environmental, Source Capture and PPE Solutions and Choosing the Best for Your Application

Allan Hilbert, Miller Electric Mfg. Co.

10F. 4:30 p.m. Weldability of Fine-Grain, High-Strength Tubular Steel

James Kaszynsk and Thomas Müller, Vallourec & Mannesmann Tubes, USA

10G. 5:00 p.m. A Local-to-Global Assembling Method to Predict Distortion

Yu-Ping Yang, Edison Welding Institute

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 9:00 a.m. • Room: N240

SESSION 11: KEYNOTE ADDRESS: PROF. PHILIP WITHERS

Chair: John N. DuPont, Lehigh University

11A. 8:00 a.m. Developments in Welding and Residual Stress Mitigation in the UK

Prof. Philip Withers, The University of Manchester

PROFESSIONAL PROGRAM

9:00 a.m. – 12:30 p.m. • Room: N240

SESSION 12: APPLICATIONS OF WELD MODELING

Chair: Todd Palmer, The Pennsylvania State University

12A. 9:00 a.m. Laser Spot Micro-welding of Silicon-Silver Systems
Ashwin Raghavan and Tarasankar DeRoby, The Pennsylvania State University, and Todd A. Palmer, Applied Research Laboratory

12B. 9:30 a.m. Weld Porosity Characterization in Three-Dimensions within 304L Stainless Steel
Jonathan Madison, James Foulk III and John Emery, Sandia National Laboratories, and Larry K. Aagesen, University of Michigan

12C. 10:00 a.m. Modeling and Analysis of DE-SAW Process
Yi Lu and YuMing Zhang, Adaptive Intelligent Systems LLC

12D. 10:30 a.m. Prediction of Critical Temperatures in Grade 91 Steel
Daniel Saltzmann, Boian T. Alexandrov and John C. Lippold, The Ohio State University

12E. 11:00 a.m. Algorithm to Identify Dominant Phenomena in Welding
Patricio Mendez, University of Alberta and Nicolas E. Stier Moses, Columbia Business School

12F. 11:30 a.m. Modeling of Dissimilar Metal Weld Residual Stress Considering Temperature-Time Dependent Softening Constitutive Behavior
Dongxiao Qiao, Wei Zhang, Zhili Feng, and Yanli Wang, Oak Ridge National Lab, and Paul Crooker, Electric Power Research Institute

12G. 12:00 p.m. Correlating Alloy 690 Weld Microstructures and Thermal Cycles under Various Process Conditions
Jared Bleacher and Tarasankar DeRoby, The Pennsylvania State University, and Todd Palmer, Applied Research Lab

9:00 a.m. – 12:30 p.m. • Room: N242

SESSION 13: WELDABILITY

Chair: Thomas J. Lienert, Los Alamos National Laboratory

13A. 9:00 a.m. Canless HIP Method for Al Cladding of LEU Fuel Foils
Andrew Duffield, Paul Burgardt and Thomas J. Lienert, Los Alamos National Laboratory

13B. 9:30 a.m. Repair Welding of Sensitized Aluminum
Kim Tran and Caroline Scheck, Naval Surface Warface Center, Carderock Division

13C. 10:00 a.m. Hydrogen Induced Cracking Test for Naval Steels
Xin Yue and John C. Lippold, The Ohio State University

13D. 10:30 a.m. Weldability of Ni-Alloy for USC Boiler Applications
Jose Ramirez, Edison Welding Institute

13E. 11:00 a.m. Improvement and Modeling of the Cast Pin Tear Test Poster Sub-Title: Solidification Cracking Test is Evaluated Using FEA
Timothy Luskin, Boian T. Alexander and John C. Lippold, The Ohio State University, and Steve L. McCraken, Electric Power Research Institute

13F. 11:30 a.m. Solidification Behavior in Dissimilar Metal Welds
Ivan Mendoza and John C. Lippold, The Ohio State University

13G. 12:00 p.m. The Effect of Heat Affected Zone Softening on the Tensile Behavior of Advanced High Strength Steel Spot Welds
D. J. Radakovic and M. Tumuluru, United States Steel Corporation

AWS POSTER SESSION

The AWS Poster Session is an integral part of the AWS Professional Program. Graphic displays of technical achievements are presented for close, first-hand examination in the Poster Session. Posters present welding results and related material, which are best communicated visually, as well as research results that call for close study of photomicrographs, tables, systems architecture, or other illustrative materials. Posters are presented in five categories: Students in High School Welding Program, Students in a Two-Year College or Certificate Program, Undergraduate Students, Graduate Students, and Professionals. Be sure to stop by and observe this year's entries.

SPECIAL PROGRAMS

W42: AWS EDUCATION PROGRAM Q & A

MONDAY, NOVEMBER 12

2:00 p.m. – 3:00 p.m. • Room N258

This one hour session will provide a brief overview of new AWS educational initiatives and products including American Welding Online and the AWS virtual classroom. After the presentation, AWS Education Services staff will be available to answer questions.

W43: THE 38TH INTERNATIONAL BRAZING & SOLDERING SYMPOSIUM

MONDAY, NOVEMBER 12

2:00 p.m. – 5:00 p.m. • Room N262

Hear expert panel discussions on current state-of-the-art technologies and emerging developments in brazing and soldering.

AWS CERTIFICATION EXAM

WEDNESDAY, NOVEMBER 14

7:00 a.m. – 6:00 p.m.

Exam 1 Rooms: N219/220

Exam 2 Rooms: N221/222

Advance application required. Take your exam to certify as a CWI, CWE, CWS, CWSR, SCWI, CWEng, or test for endorsements. The CWI exams will be offered in both English and Spanish. Advance application through AWS is required for qualification to take the exam(s). All Spanish exam applicants must make the notation "Spanish Examination" on the first page of the application. Call 1-800-443-9353 ext. 273, or go to www.aws.org/certification for details on the certification and registration requirements

EDUCATIONAL SESSIONS

3-Day AWS Educational Sessions *- Registration Code: W40*

1-Day AWS Educational Sessions *- Registration Code: Monday W37, Tuesday W38, Wednesday W39*

MONDAY, NOVEMBER 12

8:00 a.m. – 5:00 p.m. • Room: N264

A valuable program for educators and trainers is held every day of the show. Attendees may register for one or more days. Organized by AWS and Weld-Ed, these sessions highlight the latest developments in welding education and training, and are appropriate for educators and trainers at all levels of instruction.

TUESDAY, NOVEMBER 13

8:00 a.m. – 5:00 p.m.• Room: N264

This year's Plummer Memorial Education Lecture is titled "Welding Engineering Education and Training – National and International Perspectives Confessions of a PhD Who Can Actually Weld" by Yoni Adonyi. Yoni Adonyi received his PhD degree in welding engineering from The Ohio State University. While at U.S. Steel Technical Center as well as teaching as adjunct professor at Carnegie Mellon University, he became professor of welding engineering at LeTourneau University in 1996. In 1998 to present, he is the first endowed Chair in Welding and Materials Joining Engineering which is named for Omer Blodgett from The Lincoln Electric Company. Also, since 2007, he is Adjunct Professor, Université de Montpellier 2, Polytech', Nimes Campus, France. He has conducted applied research on the weldability testing of new high-performance weathering steels, has more than 28 publications in both refereed and non-refereed technical journals, and has presented more than 20 technical presentations. He has been an AWS member since 1983, has served on various technical and qualification committees, is a Professional Engineer, State of Texas, and is a member of the International Board of Trustees, Samara State University, Russian Federation.

8:00 a.m. – 8:15 a.m.

Welcome/ Introduction

8:15 a.m. – 9:00 a.m.

Teaching the Science of Welding

David Hernandez, American Welding Society

9:00 a.m. – 10:00 a.m.

The Future of Welding Education

Ed Norman, EDCO Industries, LLC

10:00 a.m. – 10:45 a.m.

Recruiting Students into Welding Programs – Panel Discussion

EDUCATIONAL SESSIONS (cont'd)

10:45 a.m. – 11:45 a.m.

Plummer Memorial Award Lecture

Yoni Adonyi, LeTourneau University

11:45 a.m. – 1:30 p.m.

Lunch Provided

1:30 p.m. – 2:00 p.m.

Adams Memorial Award Lecture

Dr. Sudarsanam Suresh Babu,
The Ohio State University

2:00 p.m. – 2:30 p.m.

Critical Roles for Welding Trade Schools

Scott A. Mazzulla, Hobart Institute of Welding Technology

2:30 p.m. – 3:00 p.m.

Understanding AC GTAW Adjustments on Inverters

Nick Peterson, Miller Electric Mfg. Co

3:00 p.m. – 3:30 p.m.

Bridging the Gap Between Welding Education and Employer Expectations

Dwight Myers, ESAB Welding & Cutting

3:30 p.m. – 4:00 p.m.

SENSE Update

Ed Norman/ Steve Houston

4:00 p.m. – 5:00 p.m.

Education Panel Discussion

WEDNESDAY, NOVEMBER 14

8:00 a.m. – 12:00 p.m.• Room: N264

8:00 a.m. – 9:00 a.m.

Motivating a New Generation of Student through Gamification and Crowdsourcing

David Hernandez, American Welding Society

9:00 a.m. – 9:30 a.m.

Connecting the Welder to the Business of the Weld Shop

Scott A. Miner, Las Positas College

9:30 a.m. – 10:00 a.m.

Practical Welding Metallurgy Object Lessons about Solidification

Larry Zirker

11:00 a.m. – 11:30 a.m.

Lincoln Supports Welding Education

Jason Schmidt, The Lincoln Electric Company

11:30 a.m. – 12:00 p.m.

Mastery Based Blended Learning

Robert Shigley, Victor Technologies

SOCIETY SPECIAL EVENTS

MONDAY, NOVEMBER 12

AWS OPENING SESSION & ANNUAL BUSINESS MEETING

9:00 a.m.-12:00 p.m. Room: N255/257

During the AWS Opening Session and the 92nd Annual Business Meeting, 2012 AWS President Bill Rice will give the Presidential Report and Nancy Cole will be inducted as the AWS President for 2013. Following the induction, the 2012 Class of AWS Counselors and Fellows will also be introduced. This meeting is open to all AWS Members and show registrants.

COMFORT A. ADAMS LECTURE

10:30 a.m.-11:30 a.m. Room: N255/257

The Comfort A. Adams lecture this year is titled "Fluid Flow and Solidification in Welding: Three Decades of Fundamental Research at the University of Wisconsin" by Dr. Sindo Lou. Sindo Kou received his PhD degree in materials science and engineering from the Massachusetts Institute of Technology. He worked at General Motors Research Laboratory (1978), and as an associate professor at Carnegie-Mellon University (1979 to1983). In 1983, Kou joined the University of Wisconsin-Madison where he became a full professor in 1985. He is currently chair of the Department of Materials Science and Engineering. He has authored two texts: Welding Metallurgy (1987, 1st edition; and 2003, 2nd edition, Wiley, New York, N.Y.), and Transport Phenomena and Materials Processing (1996, Wiley, New York, N.Y.). For his scientific contributions, he has received numerous honors, awards, and has been recognized as an ASM International Fellow (1998) and as an AWS Fellow (2002).

AWS OFFICERS/PRESIDENTS/ COUNTERPARTS RECEPTION

6:30 p.m. The Las Vegas Hotel & Casino

This reception is held annually during the show and is open to all registrants. Take advantage of this opportunity to meet the AWS Officers, network with members and prospects. A complimentary hors d'oeuvres buffet is included, along with a cash bar. Evening business attire.

SOCIETY SPECIAL EVENTS

TUESDAY, NOVEMBER 13

AWS AWARDS/ AWS FOUNDATION LUNCHEON

12:00 p.m. – 2:00 p.m. Room: N258/260

As the Society and the industry it serves have grown, so has the need to recognize outstanding scientists, engineers, educators, and researchers. Join an assembly of distinguished award presenters, recipients, and guests for a well-paced ceremony and a delicious lunch. The cost for attending the ceremony is $30 and is open to all registrants. Tickets will also be available at the door.

AWS NATIONAL NOMINATING COMMITTEE - OPEN MEETING

2:00 p.m. – 3:00 p.m. Room: N256

AWS Members are requested to submit their recommendations for National Officers to serve during 2013. Nominations must be accompanied by 16 copies of biographical material on each candidate, including a written statement by the candidate as to his/her willingness and ability to serve if nominated and elected.

WEDNESDAY, NOVEMBER 14

R.D. THOMAS, JR. INTERNATIONAL LECTURE

10:00 a.m. – 10:30 a.m. Room: N232

The recipient of this year's R.D. Thomas, Jr. Award is David Bolser from The Boeing Company. Mr. Bolser's lecture is titled "Standards for Friction Stir Welding Aluminum."

AMERICAN COUNCIL OF IIW

10:30 a.m. Room: N232

(immediately following the R.D. Thomas, Jr. International Lecture)

American Council of the IIW, meeting of the U.S. member body of the International Institute of Welding.

IMAGE OF WELDING AWARDS CEREMONY

12:00 p.m. – 2:00 p.m. Room: N259/261

The best and brightest stars in the welding industry will be honored for their outstanding industry achievements at the 10th Annual Image of Welding Awards. Presented by the AWS and WEMCO, a standing committee of AWS, the Image of Welding Awards is the industry's top honors saluting the year's most outstanding public initiatives and programs that promote the image of welding. By invitation only. This year the Image of Welding Awards Ceremony will be held in conjunction with the AWS Section Appreciation Lunch.

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Courtyard Convention Center	1.0 Blocks	$124
Embassy Suites Convention Center	0.5 Miles	$145
Encore at Wynn Las Vegas	1.2 Miles	$199
Harrahs Las Vegas	2.0 Miles	$49
Hilton Grand Vacations Suites Las Vegas	0.7 Miles	$135
Las Vegas Marriott	1.0 Blocks	$139
LVH (formerly Las Vegas Hilton) – *AWS HQ Hotel*	Adjacent	$95
Mirage Hotel and Casino– *SME HQ Hotel*	1.6 Miles	$149
Paris Las Vegas	2.5 Miles	$99
Renaissance Las Vegas	1.0 Blocks	$179
Residence Inn Convention Center Las Vegas	1.0 Blocks	$134
Riviera Hotel and Casino	1.0 Miles	$62
SpringHill Suites Convention Center	1.0 Blocks	$129
Treasure Island – *PMA & CCAI HQ Hotel*	1.2 Miles	$105
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- Interactive floor maps that make it easy to find who (and what) you are looking for
- Personalized agenda planner you can use to create a list of must-see exhibits
- A full schedule of education sessions and the ability to add to your planner
- Real-time alerts that remind you of what's happening at the show
- A live Twitter stream that connects you to up-to-the-minute show news
- Local destination information with restaurant options and things to do

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