

Dell A. Crouch, Jr.

108 Essex Ct.

Noblesville, IN 46062

317-877-1228 (home)

317-579-3773 (work until September 30, 2005)

317-371-1746 (mobile)

dellcrouch@insightbb.com (home)

dell.a.crouch@delphi.com (work)

dell@dellcrouch.com (work after September 30, 2005)

Objective:

Position in Energy Storage Technology and/or Controls

Qualified by 38 years of experience in industrial research and development, product development, sales support and technical service with increasing responsibilities

Responsibilities Have Included:

- * Project planning & management
- * Original Research
- * Product Management
- * Raw Material Qualification
- * Specifications
- * Algorithm Development
- * Battery Pack Cycling
- * Instructor – Internal and External
- * Industry Technical Committees for over 20 years
- * Group Management
- * Sales Support
- * Manufacturing Cost Estimates
- * Market Development
- * Internal and External Communications, Written and Oral
- * Process Improvement

Professional Experience:

DELPHI ENERGY AND CHASSIS SYSTEMS (formerly Delco-Remy Division of GM) Castleton, IN,
(1999 – present)

Staff Research Engineer (promoted in 1998-present)

1998-2005 – Technology Surveillance – assessment of current battery technologies and new applications – NiMH, Li ion, Hybrid vehicles, standby power, etc.

2005 – Assisted department manger in presentations to business team – technology assessment, technology roadmap, etc.

2004 – Traveled to Italy to oversee sample fabrication of 6T AGM battery samples for US military, standby power system patent

2003 – Designated instructor for Battery 101 Course for new hires. Presented at International Truck and Engine January, 2004

Tech Shows at Freightliner, Portland, OR, and at Paccar, Seattle, WA, Attended and reported on SAE Congress (March), SAE Truck and Bus, (November), and MIT, Dearborn (March). Made responsible for Battery Technology Roadmap (shown to senior executives at headquarters)

Member – SAE subcommittee for new life test for automotive batteries

Submitted 6T AGM battery samples to NSWC, Crane, IN for life testing (completed and passed)
Asked to consult in writing of Type 2 AGM 6T battery specification (with Smart Battery Features)

2002 – 2 patent disclosures submitted and assigned, 1 granted (see list at end of this resume),
attended and reported on MIT Marina del Rey, first contact with US Army National Automotive
Center (TACOM) – commented on draft AGM battery specification, presented AGM battery
technology to Army personnel at Delphi HQ, Presentations to Audi, FIAT and ALABC in Europe,
State of Health algorithm patent

2001 – Represented Delphi at USCAR/MIT 42V Battery Termination Task Force meetings,
Presentation at DOE Energy Storage workshop, Washington, DC, Lucent Standby Power Battery
Program, letter of gratitude from DOE Office of Heavy Vehicle Technology, Evaluated competitors
technology and intellectual property for possible purchase

2000 – Presentations at MIT Spartanburg, SC and Nagoya, Japan, 42V Battery Termination Task
Force meetings, Lucent Standby Power Battery Program, Meetings with SAFT in Bordeaux,
France, Attended and reported on first AABC conference, gave paper at SAE FTT Conference,
Los Angeles, CA, Vice Chairman, SAE EV Battery Committee, Evaluated High Voltage
Breakdown test at Ca-Le Joint venture battery plant in Mexico

1999 – Re-wrote SAE standard J1715 “Electric Vehicle Terminology”, Developed Breakdown test
settings, Evaluated Breakdown test at Olathe, KS plant. Presented paper at Global Powertrain
Conference, Stuttgart, Germany, Toyota Tech show in Nagoya and Isuzu Tech show in Fujisawa,
ALABC meeting

Delco Remy Division of General Motors, Castleton, IN

1991-1998

1998 – Provided training at Tokyo Tech Center + customer presentations at Honda, Nissan and
Toyota, Audi Smart Battery Program, Ford Ranger Electric Vehicle Program

1991-1997 – Sr. Project Engineer, GM Electric Vehicle Program

Received President’s Council Honors Award from GM Executive Staff in 1996

Responsible for algorithm development and battery pack validation for GM EV1 electric vehicle
program.

Group leader for control strategies - supervised 3-4 engineers, charge algorithm implemented on
GM EV1, SOC algorithm implemented on Ford Electric Ranger pickup truck.

Conducted training class in algorithms at Honda R&D, Tochigi, Japan.

Achieved 30,000 miles on battery pack without module replacement, 2 patents, promoted to
technical 8th level 1998.

EVANITE FIBER CORPORATION Corvallis, OR 1981-1991

Manager Technical Services, Battery Separator Division, 1989-1991

Responsible for staff of six scientists and technicians, raw material specification, qualification,
testing. Analytical services. Environmental monitoring for polyethylene-sislica and glass fiber
separators

Represented Evanite on BCI technical subcommittee on battery separators, wrote industry standard procedures for ohmic resistance and volume porosity.

Manager Product Development, 1981-1989

Served as AGM product manager, including direct sales and presentations to customers, writing strategies, performed original research and presented it to national and international audiences, conducted production trials on full size paper machine, wrote white papers and conducted battery testing for internal and external use.

Customer presentations at every major battery manufacturer in the US.

GNB INDUSTRIAL BATTERIES Langhorne, PA 1979-1981

Product Development Supervisor – Stationary Batteries (Standby Power)

Designed, developed, and initiated production of new stationary power cells for UPS applications

Technical support for sales, manufacturing and AT&T Round Cell program

Represented GNB on IEEE committee concerning the integration of batteries and solar cells into the electrical grid

NL Industries Hightstown, NJ 1978-1979

Senior Engineer, Metals Division

Qualified new low antimony grid alloy with battery industry customers, developed new plant processes for shift in product line demand from antimonial lead to soft lead.

OTHER PROFESSIONAL EXPERIENCE

ESB, INCORPORATED Yardley, PA 1970-1978

Product and process development in molten salt battery and ultracapacitor systems (same electrolyte as ZEBRA battery) two process patents, two papers, one presented at 1972 fall meeting, Electrochemical Society. 2 promotions.

CATALYST RESEARCH CORPORATION Baltimore, MD 1967-1970

Developed and shipped thermal cell for NASA Venus space probe – high temperature molten salt primary system.

EDUCATION

Bachelor of Science, Chemistry, 1968
Towson University, Baltimore, Maryland

Numerous other short courses

PATENTS GRANTED

PATENT NUMBER	TITLE	DATE	ASSIGNEE	WENT TO PRODUCTION?
3832452	"Purification of Anhydrous Aluminum Chloride in a Sale Melt"	8-27-1974	ESB Inc. (now Exide)	No
3960597	"Method of Fabricating Electrochemical Cell"	6-1--1976	ESB Inc. (now Exide)	No
5561360	"Battery Cycle Life Improvement through Bifurcated Recharge Method"	10-1-1996	GM (now Delphi)	Yes – GM EV1
5578915	"Dynamic Battery State of Charge and Capacity Determination"	11-26-1996	GM (now Delphi)	Yes – Ford Electric Ranger Truck
6369578	"State of Health for Automotive Batteries"	4-9-2002	Delphi	No
6774602	"Apparatus and Method for Providing Temporary Power"	8-10-2004	Delphi	No
6946218	"Battery Cell Having Edge Support and Method of Making the Same"	9-20-2005	Delphi (Enerdel)	No

PUBLICATIONS and PRESENTATIONS

"Energy Storage on Porous Carbon Electrodes" Electrochemical Society, October 1972

"Batteries and the Economics of Load Leveling" IEEE, 1974

"Relating Recombination Mat Separator Properties to Sealed Lead-Acid Battery Performance" Journal of Power Sources, 1990, Also presented at LABAT, 1989, Varna, Bulgaria and ILZRO Battery Conference, 1989, San Francisco

"Improved Separator Media for Recombinant Lead-Acid Batteries" ILZRO Battery Conference, Orlando, 1990

"Battery Pack Cycling for Hybrid Electric Bus Application", October, 1999 Global Powertrain Conference, Stuttgart, Germany

"Batteries for 42/14 Volt Automotive Electrical Systems" SAE Future Transportation Technology, Los Angeles, CA August, 2000 and MIT Consortium, Nagoya, Japan, October, 2000

"New Directions in the Valve Regulated Lead-Acid Battery", IUPUI School of Engineering, November, 2000

“Energy Storage (Batteries)” Essential Power Systems Workshop, DOE, Washington, DC, December, 2001

“Battery Technology for Automotive Applications”, Chapter 31 in *Handbook of Automotive Power Electronics and Motor Drives*, CRC Press, 2005.