



4000 Embassy Parkway - Suite 230 - Akron, Ohio 44333-8328 USA
Phone: 330-670-9566 / Fax: 330-670-9844
Email: bobeller@prodigy.net - Home Page: www.robertellerassoc.com

PROFITABLE GROWTH TECHNOLOGIES IN INTERIOR SOFT TRIM

PREPARED FOR:

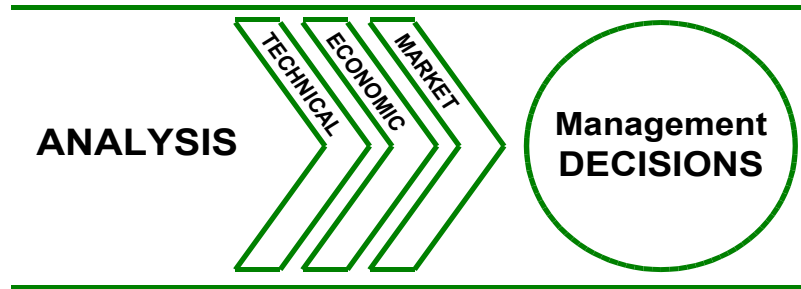
**JORNADAS DE
PLASTICOS EN AUTOMOCION
BARCELONA, SPAIN**

JUNE 19, 2003

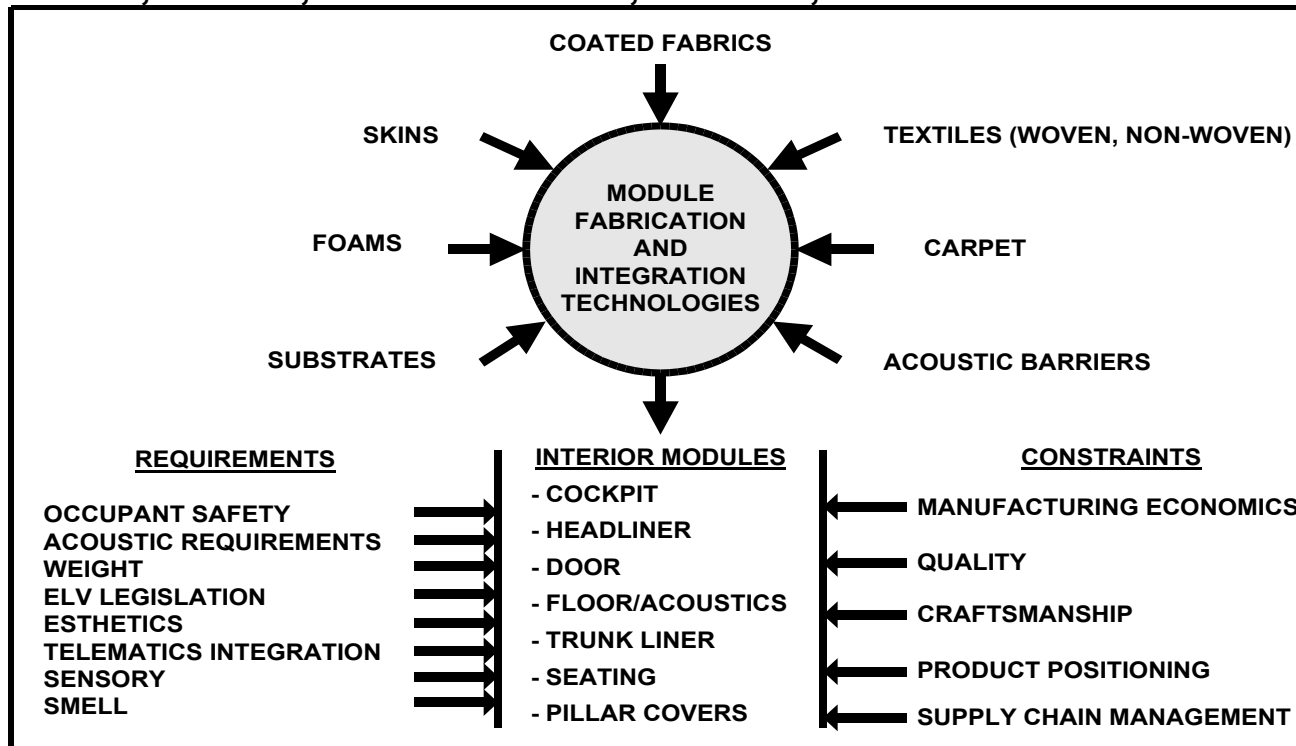
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PRESENTATION HIGHLIGHTS

- **OPERATING HYPOTHESES**
- **CURRENT AUTOMOTIVE SITUATION**
- **DRIVING FORCES FOR SUBSTITUTION**
- **EUROPE/NAFTA DIFFERENCES**
- **VALUE ADD STRATEGIES**
- **MATERIALS/PROCESS TECHNOLOGY
SHIFTS → IMPLICATIONS**
- **UNREALIZED VALUE OPPORTUNITIES**
- **CURRENT EXAMPLES**



Automotive Interior Soft Trim: Skins, Foams, Coated Fabrics, Textiles, and Acoustic Barriers



Prospectus for a Global Multiclient Industry Analysis
Robert Eller Associates, Inc.

slide-covautointsofttrim701 02.vsd

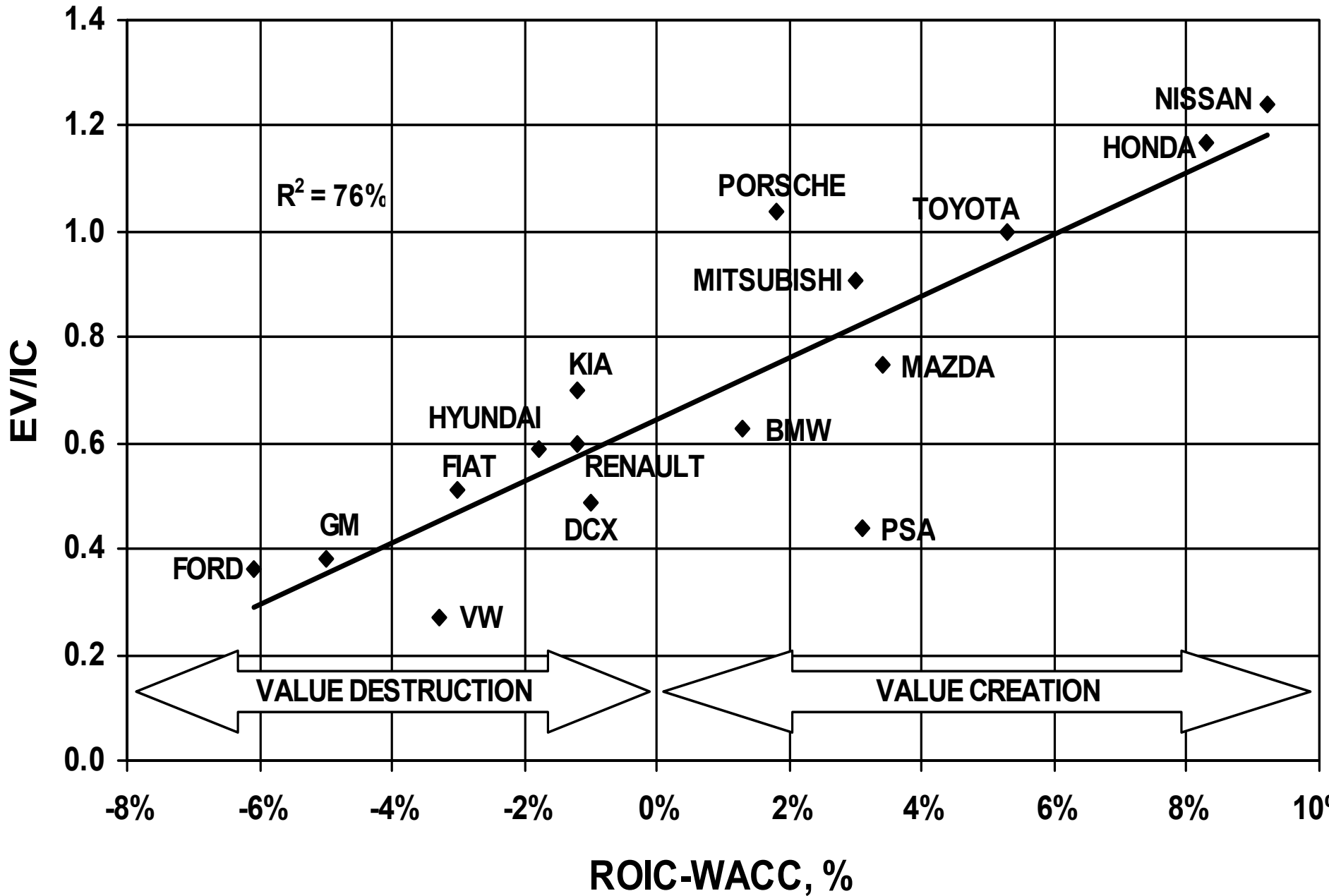
SOME OPERATING HYPOTHESES

- **SEVERE PRICE PRESSURE → VALUE CHAIN SHIFTS**
- **VALUE-ADD OPP'YS : UNDEREXPLOITED**
- **BOTH MATERIAL/PROCESS COST SAVING POSSIBILITIES**
- **EUROPE/NAFTA TECHNOLOGIES ARE CONVERGING**
- **ACOUSTICS PROPERTIES WILL BE MAJOR DRIVERS**
- **CURRENT CONSTRUCTIONS ARE INEFFICIENT**
- **FOAMS ARE KEY VALUE CHAIN SHIFT ELEMENT**
- **NON-STRUCTURAL COMPOSITES WILL GROW**

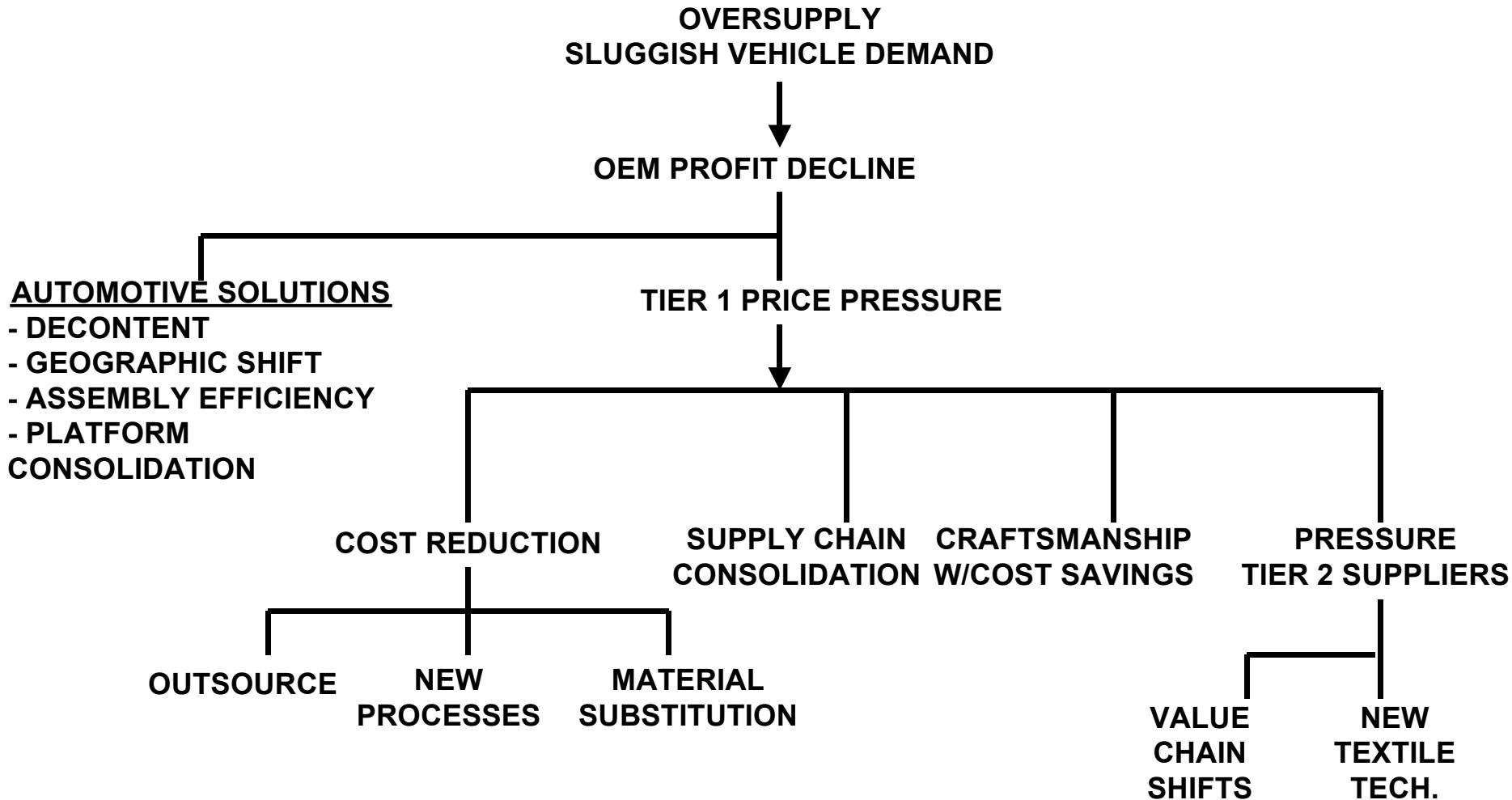
SNAPSHOT OF CURRENT AUTO SITUATION

- **RECESSIONARY GLOBAL ECONOMY**
- **VEHICLE PRICES CONTINUE DECLINE**
- **SEVERE OEM DOWNWARD PRICE PRESSURE**
- **RESIN PRICE INCREASES(2003)→ PROFIT DECLINE**
- **GLOBAL AUTO MFG OVERCAPACITY**
- **TIER 1 CONSOLIDATION CONTINUES**
- **TIER 1 PURCHASE POWER INCREASE**
- **MINOR PROCESS EVOLUTION TO DATE**
- **THE VALUE CHAIN MUST SHIFT**

GLOBAL OEM VALUATION ANALYSIS (2003)



OEM/SUPPLIER DYNAMICS



HIGH VOLUME PLATFORM EXAMPLES

OEM	PLAT	MOD	MM UNITS
VW	PQ35	GOLF	2.4
	PQ24/25	POLO	1.2
FORD	F-SERIES	LT. TRUCKS	1.1
	MAZDA6	FUTURA FORD 500 FREESTYLE	0.8
	C1	FIESTA	1.6
GM	EPSILON		1.0
	GMT800/900	LT. TRUCKS	1.5
TOYOTA	COROLLA		1.5
PSA	PFI	206	1.7

DRIVING FORCES FOR INTERIORS MATERIAL/PROCESS SUBSTITUTION

- **SYSTEMS COST SAVINGS**
- **WEIGHT SAVINGS**
- **OIL RESISTANCE**
- **ODOR FREE INTERIORS**
- **ELIMINATION OF COATINGS**
- **MOLDED-IN COLOR**
- **NVH CONTROL**
- **ACOUSTIC PERFORMANCE**
- **ENERGY ABSORPTION(OCCUPANT SAFETY)**
- **RECYCLABILITY(AT ZERO COST PENALTY)**

VALUE ADD STRATEGIES

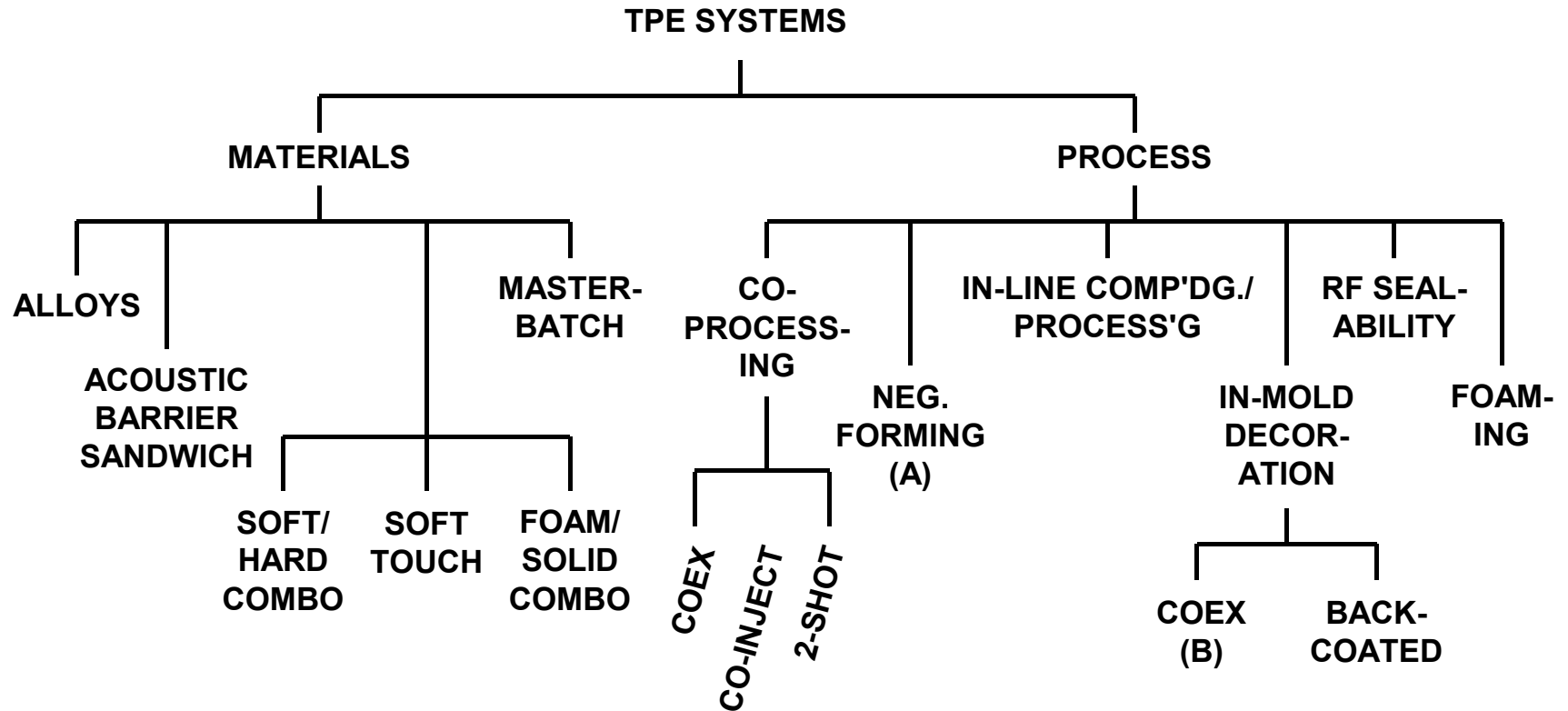
A. VALUE CHAIN SHIFT

B. MATERIAL COST SAVE

C. PROCESS COST REDUCTION

D. ADD VALUE AND FUNCTION (WITH COST SAVE?)

VALUE-ADD OPPORTUNITIES VIA SYSTEMS



NOTES:

(A) OF IP SKINS BY VISTEON AND OTHERS

(B) FOR AUTOMOTIVE APPLICATIONS; TPEs COMPETING WITH ETP FILMS

SOURCE: ROBERT ELLER ASSOCIATES, INC., 2003

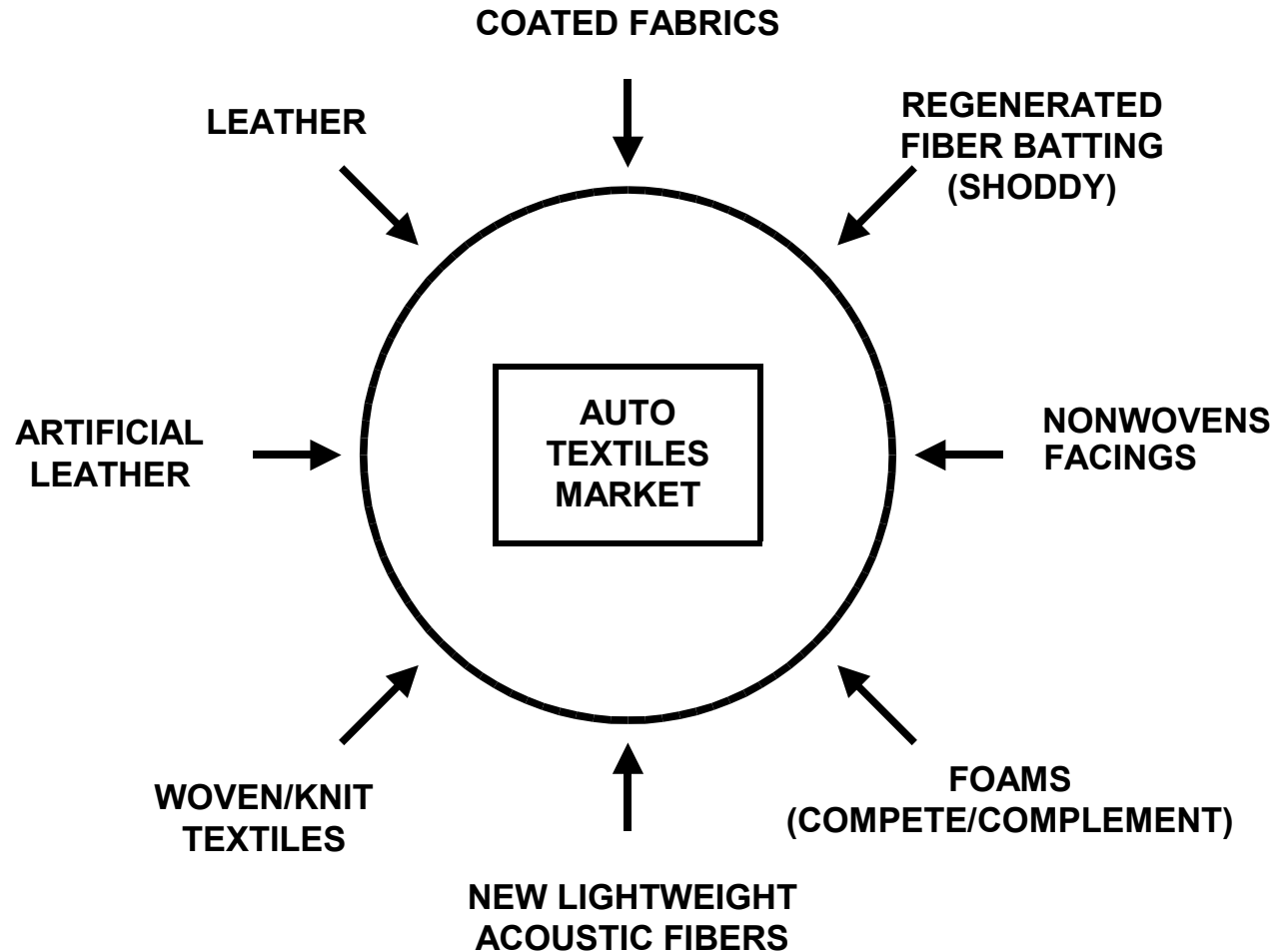
A. VALUE CHAIN SHIFT

STRATEGY	EXAMPLE
FORWARD/BACKWARD INTEGRATION	<ul style="list-style-type: none"> -TEXTILE SUPPLIERS → CONFECTION -TIER 1 → SKIN FABRICATION RADIATION X'LINK SKINS
OUTSOURCING	<ul style="list-style-type: none"> -FOAMING SEAT PADS -FLAME LAMINATION OF TEXTILES
REDUCE DEV. TIME	RAPID PROTOTYPING
SANDWICH LAYER CONSOLIDATION	<ul style="list-style-type: none"> -TPO SKIN/PO FOAM LAMINATES -ON-BOARD ACOUSTICS
REDUCE SECONDARY OPERATIONS	<ul style="list-style-type: none"> -IN MOLD AIRBAG DOOR SCORING -IN MOLD TRIM -IN MOLD ASSEMBLY

B. MATERIAL COST SAVINGS

STRATEGY	NOTE/EXAMPLE
THIN WALL	DOOR TRIM
DECORATIVE FILMS	AVOID PAINTING
SCRAP REDUCTION	MONOMATERIALS CONSTRUCTION
PVC SLUSH SKINS	NEED LOW TEMP PROPERTIES
DIRECT COMPOUNDING	-IN-USE(JCI, FAUURECIA) -USE FOR TALC/PP?
MASTERBATCH	SUBSTRATES
REACTOR GRADES	-SAVES COMPD'G
MOLDED-IN COLOR	-SUBSTRATES -SAVES PAINT

AUTOMOTIVE TEXTILES . . . AN ECUMENICAL PERSPECTIVE

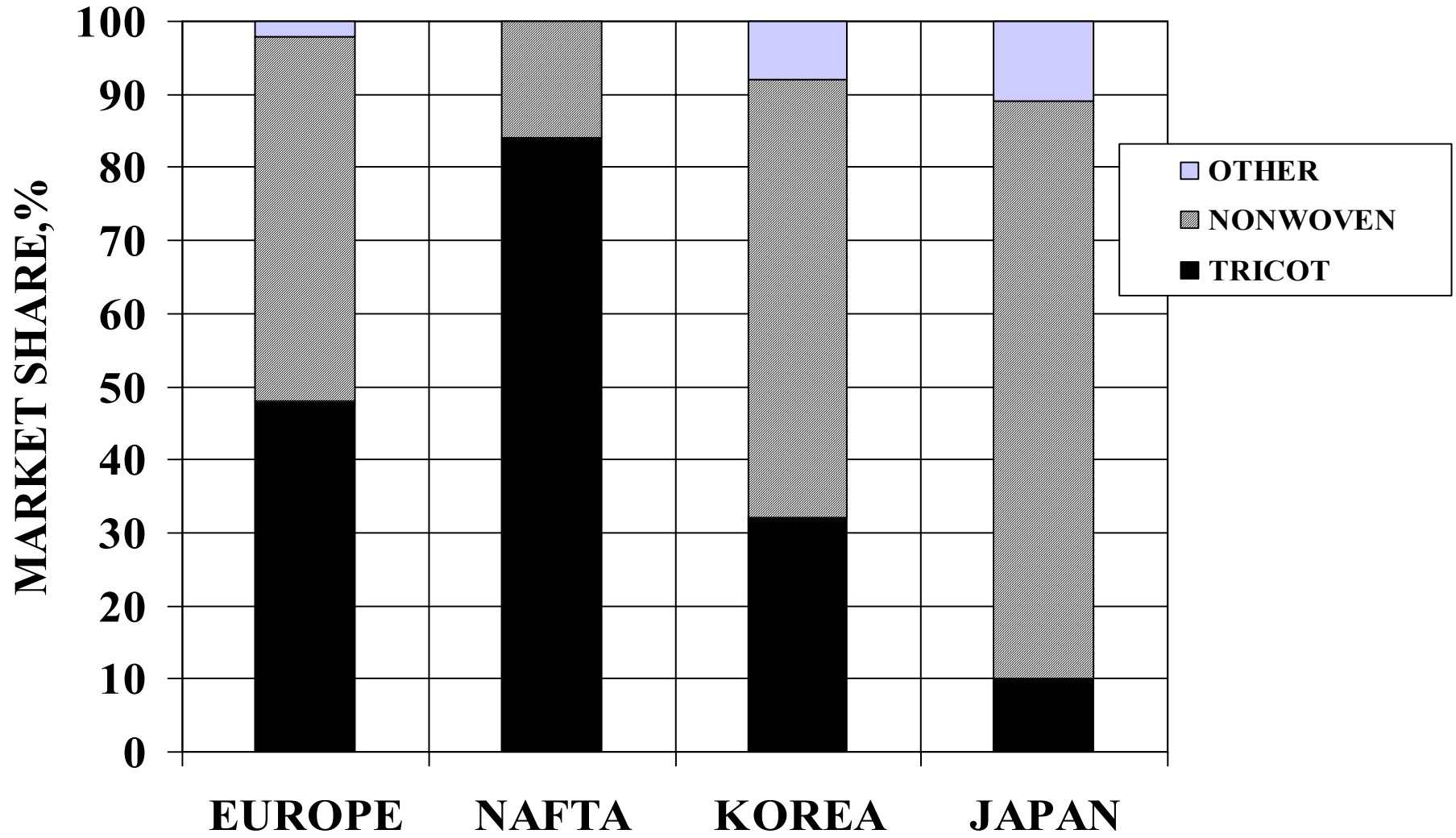


SOURCE: ROBERT ELLER ASSOCIATES, INC., 2003

NEW TECHNOLOGY NONWOVENS' SUPERIOR ATTRIBUTES

- **IMPROVED PERFORMANCE:**
 - SOFTNESS, TACTILE, CONFORMABILITY/DRAPE**
 - DURABILITY**
- **BREATHABILITY/CONTROLLED POROSITY**
- **ACOUSTIC/THERMAL INSULATION, FILTRATION**
- **UV RESISTANCE**
- **PRINTING, EMBOSSING, DYEABILITY**
- **NON-FRAYING (VS. TEXTILES)**
- **MICRODENIER**
- **FILTRATION**
- **MARKET ONLY 17% PENETRATED**

NON WOVEN HEADLINER SHARES

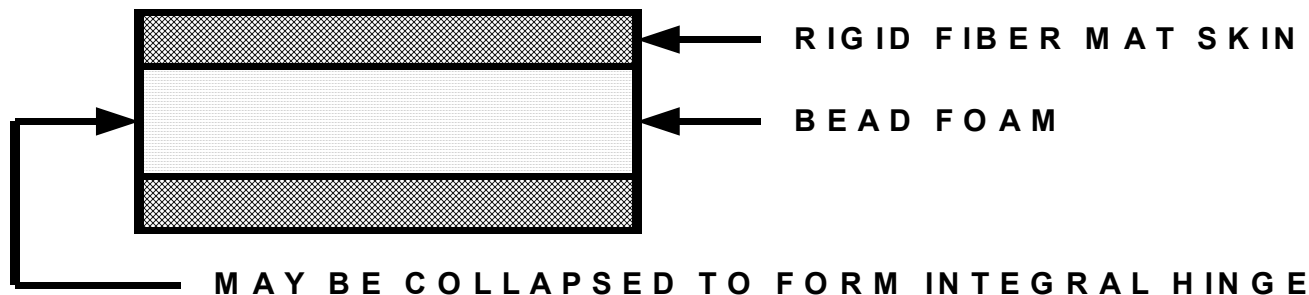


SOURCE: FREUDENBERG VITECH

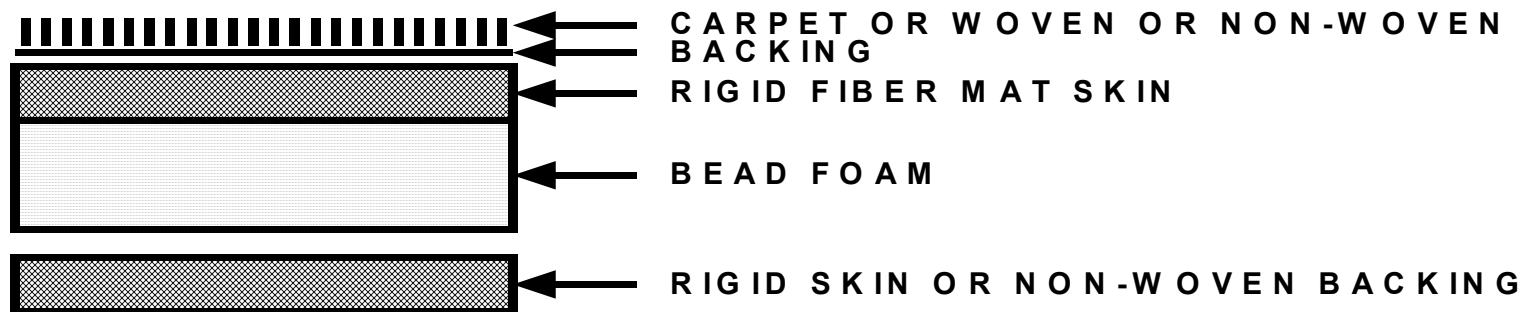
EXHIBIT 3

RIGID SEMI-STRUCTURAL FOAM SANDWICH STRUCTURE

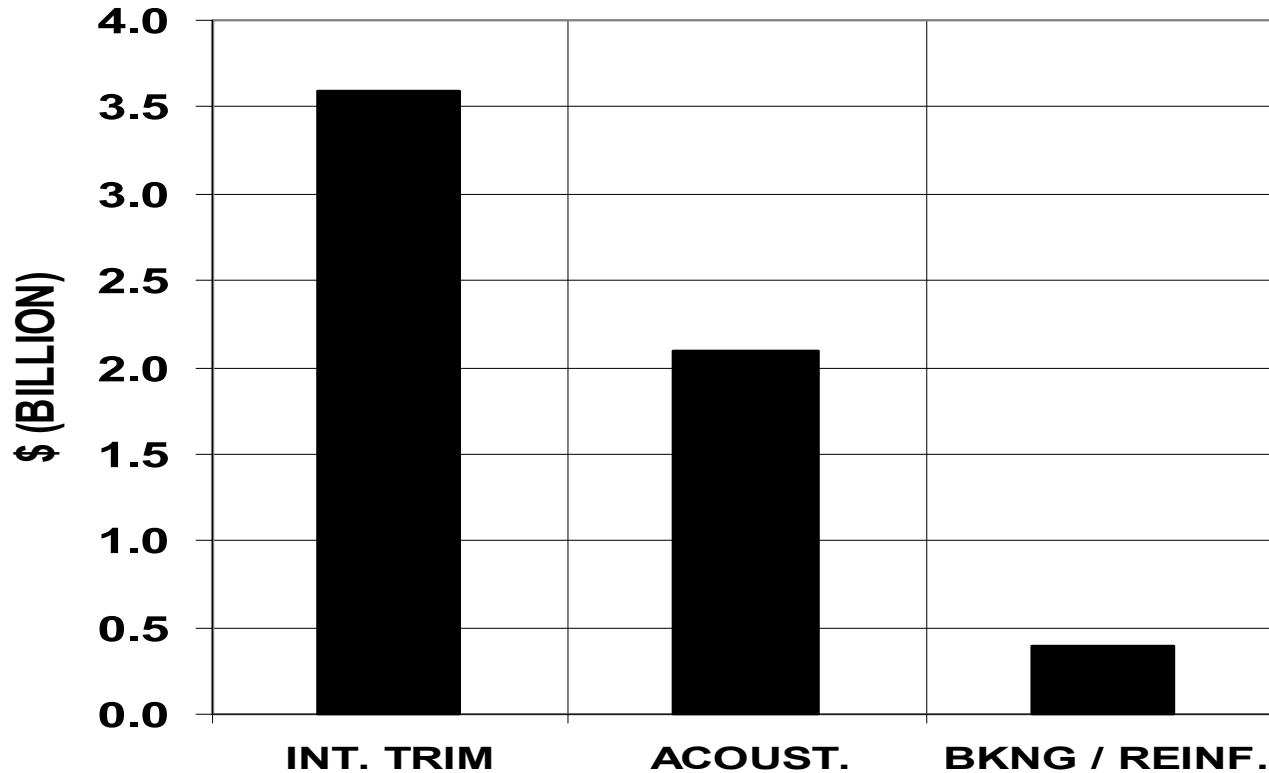
BARE:



CARPET/NON-WOVEN/WOVEN TEXTILE LAMINATE:



**AUTOMOTIVE FABRICS MARKET VALUE
(NAFTA/EUROPE), 2002**



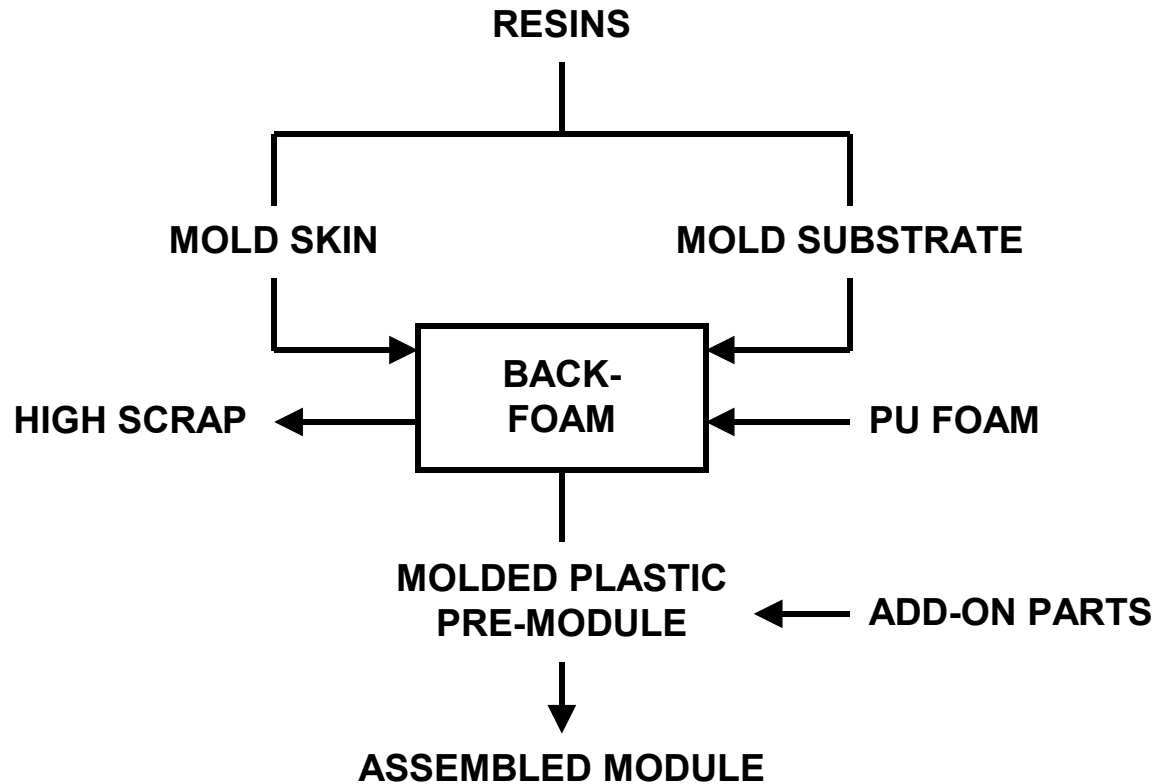
**NOTE: INCLUDES TEXTILE, NONWOVEN,
WOVEN, COATED FAB., REGEN. FIBER BATTING**

**SOURCE: ROBERT ELLER ASSOCIATES, INC.,
SOFT TRIM MULTICLIENT**

C. PROCESS COST SAVINGS

STRATEGY	EXAMPLE
IN LINE NEGATIVE FORMING SKINS	-EPP FOAM/TEXTILE -DOOR TRIM -DECORATIVE FILMS
HINTERSPRITZEN	WIDELY USED (EUROPE)
IN MOLD ASSEMBLY	HVAC LOUVERS
SANDWICH CONSOLIDATION	-FLOOR ACOUSTICS -DOOR TRIM ACOUSTICS -HEADLINER ENERGY ABSORB
RUBBER REPLACE	BODY SEALS
CO-PROCESSING	-EXTRUSION, INJECTION -BLOW MOLDING

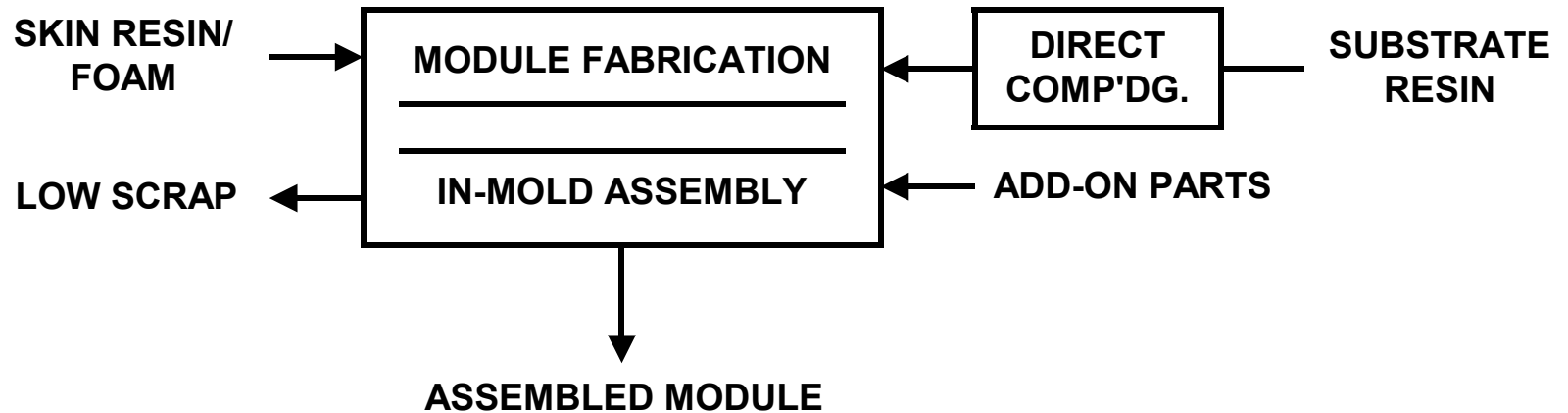
CURRENT MODULE FABRICATION (INEFFICIENT)



4-STEP OPERATION

SOURCE: ROBERT ELLER ASSOCIATES, INC., 2003

FUTURE MODULE FABRICATION (IDEAL)



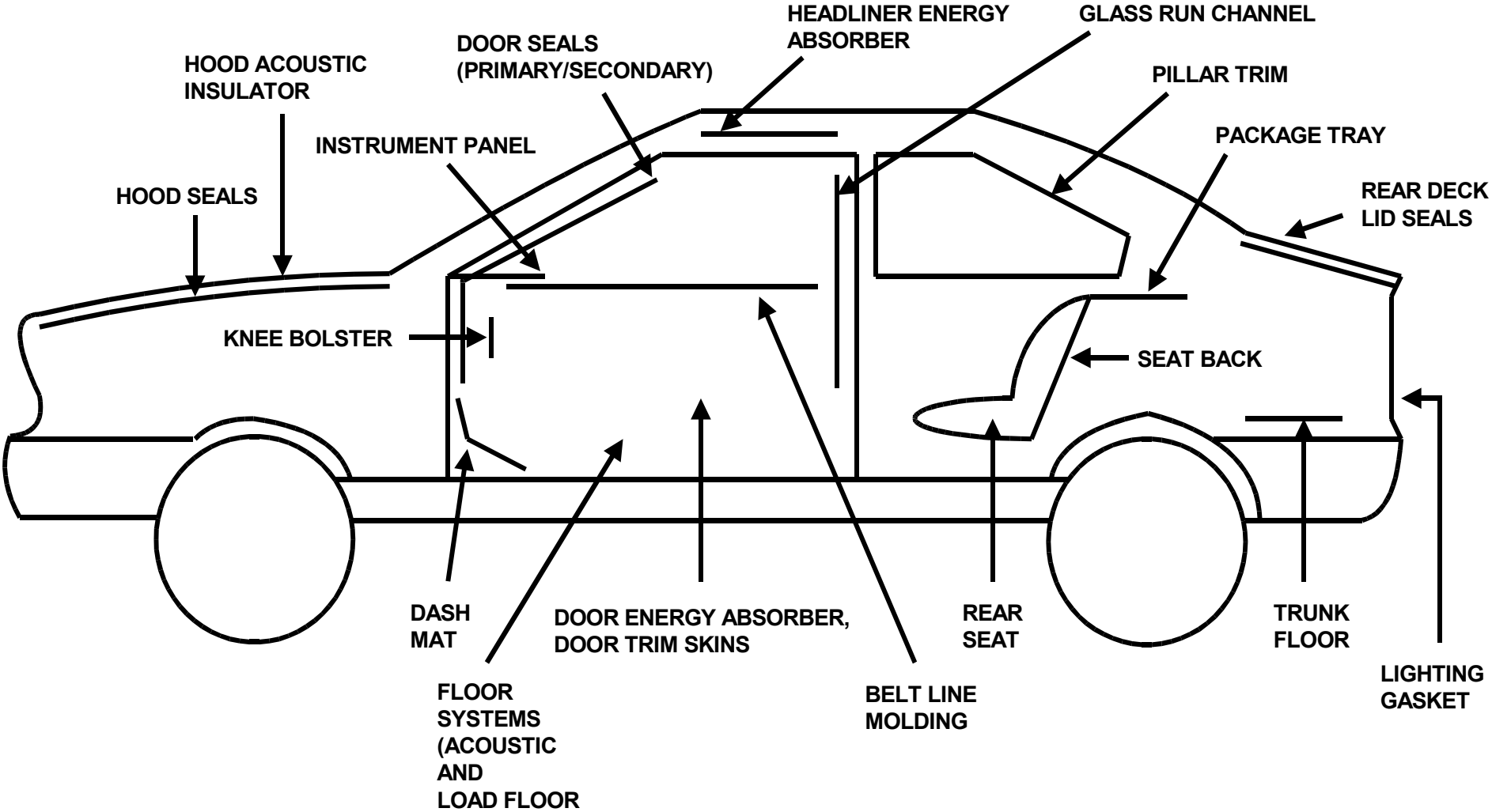
(IDEAL) 1-STEP OPERATION

SOURCE: ROBERT ELLER ASSOCIATES, INC., 2003

CPE-one step 03.vsd

EXHIBIT 1

AUTOMOTIVE FOAMS TARGETS



EXAMPLE OF PU FOAM TRUNK LINER BY RIETER



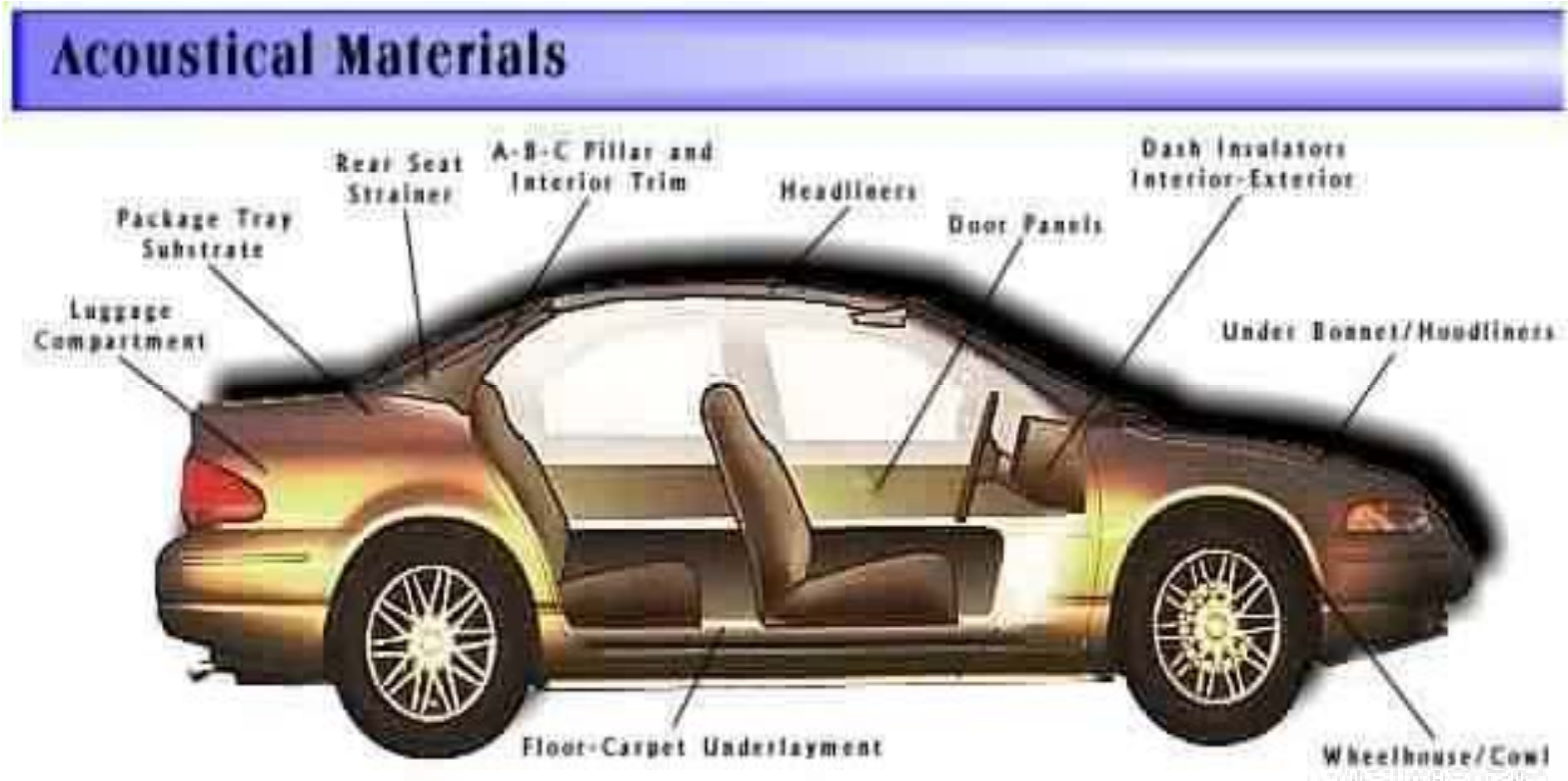
SOURCE: ROBERT ELLER ASSOCIATES, INC. 2003

EXAMPLE OF EPP USAGE IN HEADLINER (2002 PT CRUISER)



SOURCE: ROBERT ELLER ASSOCIATES, INC. 2003

LOCATIONS OF ACOUSTIC MATERIALS



SOURCE: JANESVILLE PRODUCTS, 2002

EXAMPLE OF DASH MAT LAYER CONSTRUCTION



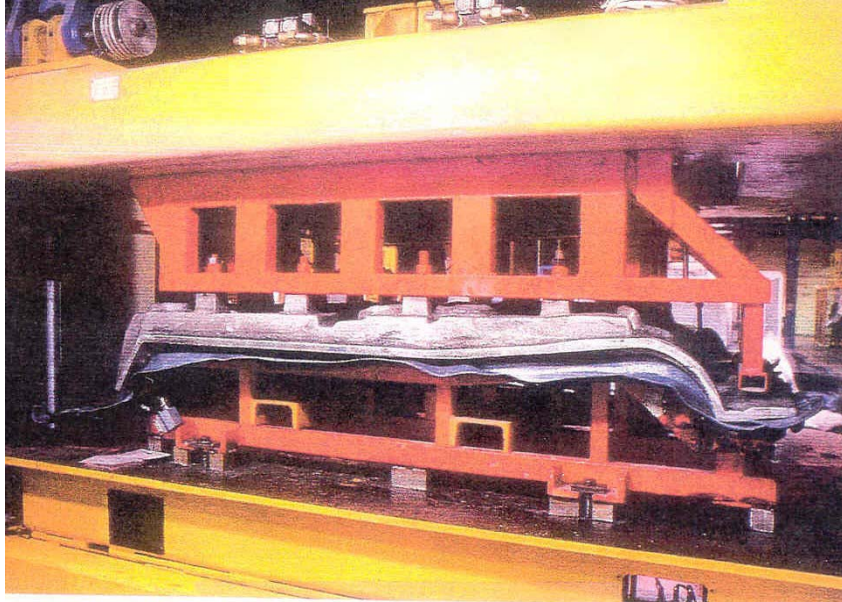
SOURCE: COLLINS AND AIKMAN

EXAMPLE OF ACOUSTIC COMPONENTS



SOURCE: HP PELZER

RIM MOLDING OF CARPET/ACOUSTIC BARRIER BY C+A



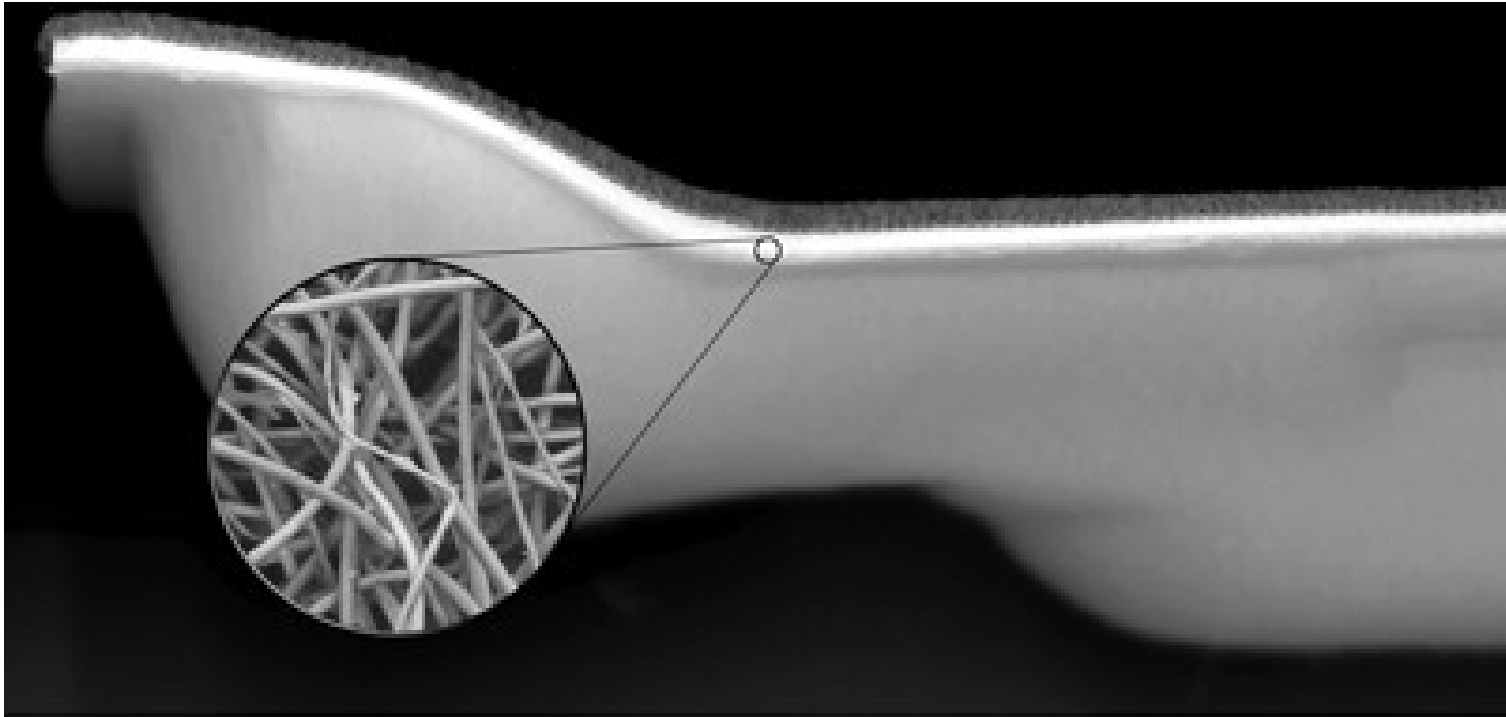
PU-RIM MOLDING OF UNDER-CARPET BARRIER FOR ROVER FREELANDER



PHOTOS: C+A

CARPET SECTION ON LOWER HALF OF PU-RIM TOOL

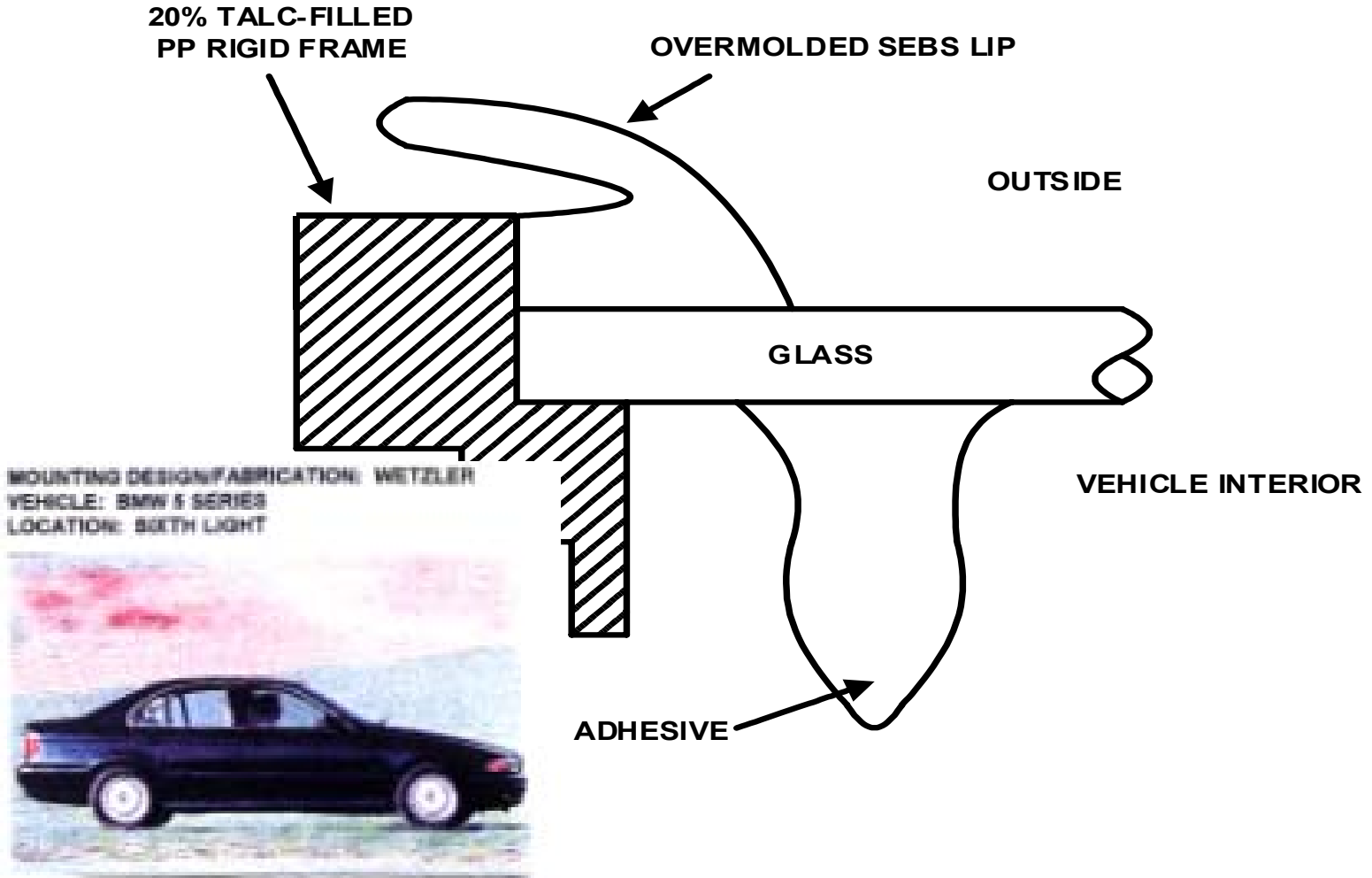
EXAMPLE OF ACOUSTICALLY TUNEABLE FIBER



Actfiber Sample of lightweight molded carpet system utilizing ActFiber. Acoustically tuned by controlling fiber length, blend and treated to increase densification where needed.

SOURCE: COLLINS AND AIKMAN

EXAMPLE OF RIGID/FOAM VALUE ADDED SYSTEM



SOURCE: ROBERT ELLER ASSOCIATES, INC.
©1994/1995

D. VALUE ADD AT REDUCED COST(SOMETIMES)

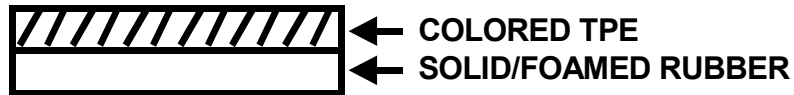
STRATEGY	EXAMPLE
IN MOLD DECORATION	-METALLICS -PATTERNS
LIGHT WEIGHT FIBERS	FLOOR/ACOUSTICS
SURFACE ESTHETICS	-NEW NONWOVENS -NEGATIVE FORMING
MICRODENIER NONWOVENS	BETTER ACOUSTICS IMPROVED DRAPE
CRAFTSMANSHIP	JCI CRAFTEC PROCESS
LUXURY FABRICS	SEAT→ DOOR TRIM,IP
SOFT TOUCH	-BUTTONS - OTHER SURFACES

VALUE-ADDED DECORATION WITH TPES

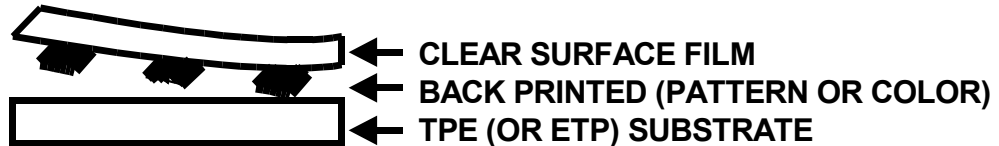
RUBBER:



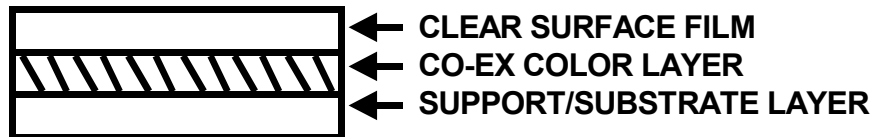
TPE VENEER:



IN-MOLD DECORATION (IMD):
BACK-PRINTED LAMINATES



IN-MOLD DECORATION (IMD):
CO-EX FILM/SHEET



MOLDED-IN DECORATIVE
(MID) EFFECTS:



TRANSPARENT



SOURCE: ROBERT ELLER ASSOCIATES, INC., 2003

EXAMPLE OF LEATHER (ALCANTARA) MEDALLION INSERT



SOURCE: ROBERT ELLER ASSOCIATES, INC. 2003

TARACELL IP EPP SEMI-STRUCTURE/TEXTILE COVERING CONCEPT (TEXTILE DETAIL)



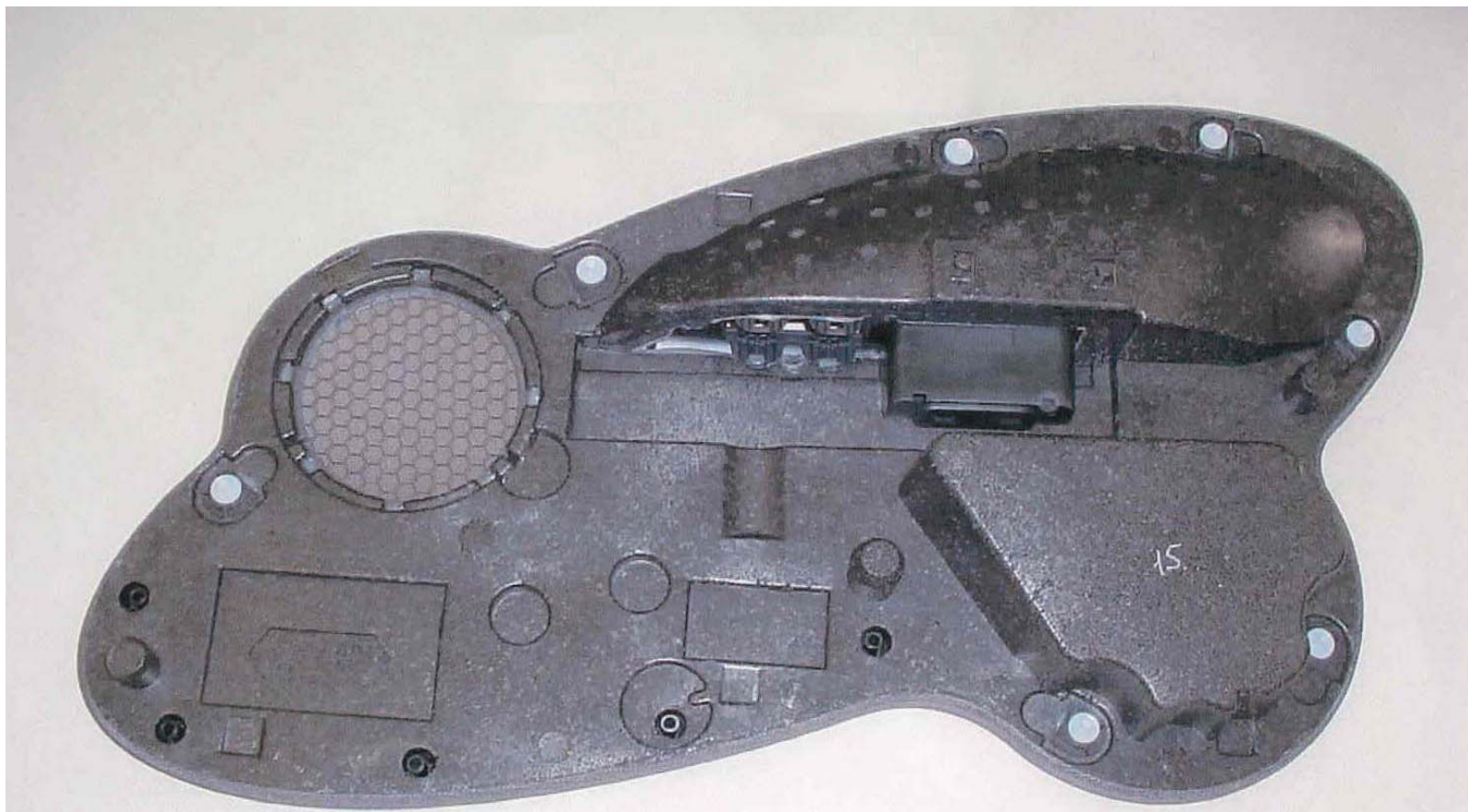
SOURCE: TARACELL

TARACELL IP EPP SEMI-STRUCTURE/TEXTILE COVERING CONCEPT



SOURCE: TARACELL

TARACELL EPP ON INTERIOR OF DOOR



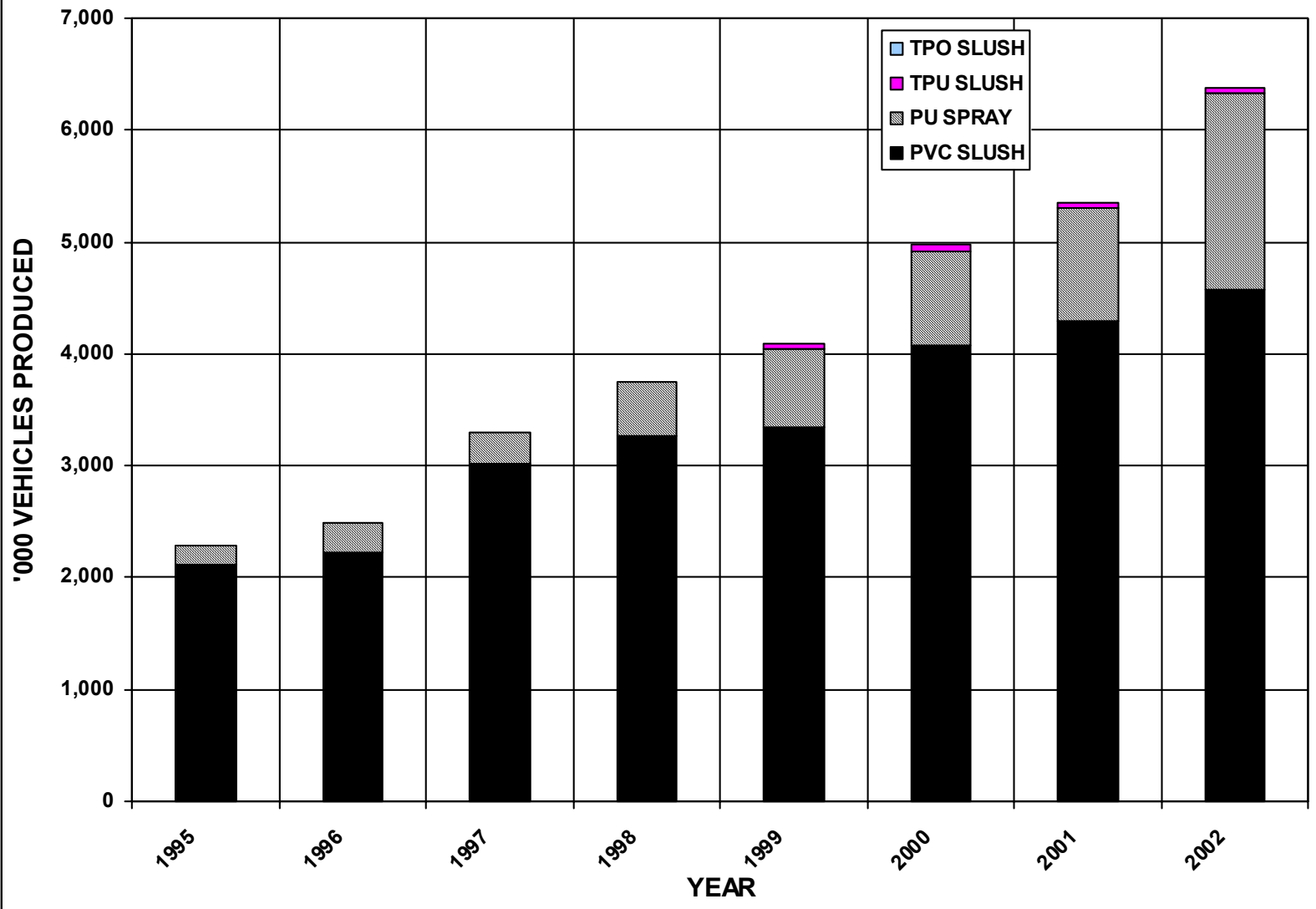
SOURCE: TARACELL

TARACELL DT EPP SEMI-STRUCTURE/TEXTILE COVERING CONCEPT



SOURCE: TARACELL

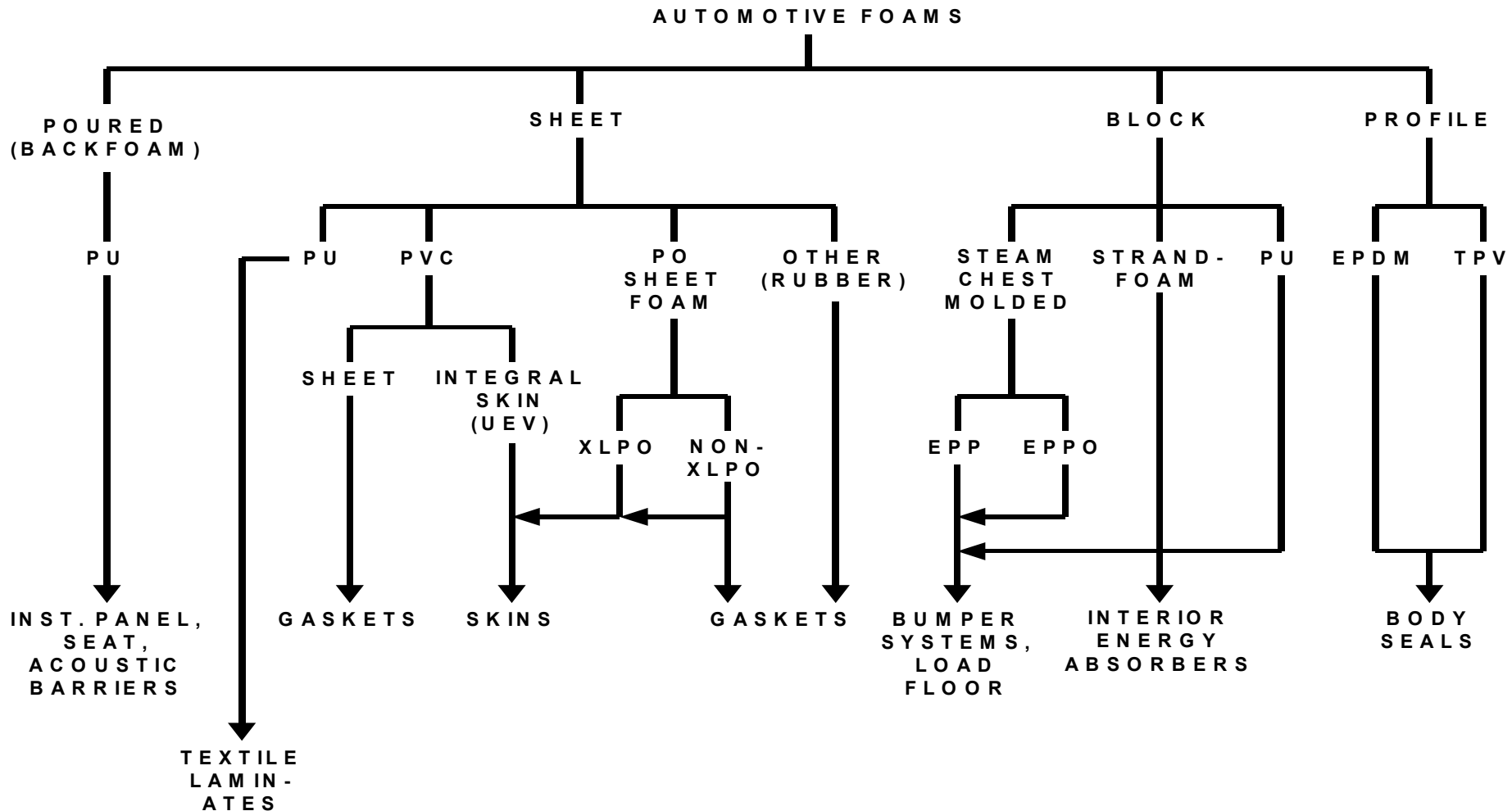
DEMAND TRENDS IN EUROPEAN SLUSH/ SPRAY IP SKINS



**SOURCE: ROBERT ELLER ASSOCIATES, INC.,
SOFT TRIM MULTICLIENT STUDY, 2003**

EXHIBIT 2

AUTOMOTIVE FOAM FAMILIES AND EXAMPLE APPLICATIONS



SOURCE: ROBERT ELLER ASSOCIATES, INC., 2002

foam families 02.vsd

WHAT WILL DRIVE PO AUTO FOAM GROWTH?

- H2O BLOWN FOAM REPLACEMENT IN BODY SEALS**
- GROWTH OF PO MICROCELL TECH.(TREXEL)**
- PROLIFERATION OF RAD-XL PO TECHNOLOGY**
- ENTRY OF LOW COST PO SHEET FOAMS**
- PO SHEET FOAM/TEXTILE LAMINATION**
- HMS PP PROLIFERATION**
- EXTRUDED THICK SHEET FOAMS(STRANDFOAM)**
- IN MOLD SKIN/FOAM LAMINATION(EPP/TPO SKIN)**
- MULTI-DENSITY CAPABILITY(EPP BEAD FOAMS)**
- I.M./EXTRUDED RIGID SHEET FOAMS(SUMITOMO)**

EXAMPLE OF MAGNESIUM ON A FIAT VEHICLE



SOURCE: FIAT

SUMMARY

- **INTENSE MODULE PRICE PRESSURE:**
 - VALUE CHAIN SHIFTS**
 - NEW MATERIALS/PROCESS TECHNOLOGY**
- **POSSIBLE TO ADD VALUE AT REDUCED COST**
- **TARGET GROWTH SECTORS:**
 - FOAMS(EPP, SHEET FOAMS, BODY SEALS)**
 - NEW NON WOVENS**
 - PVC/SPRAY SKINS**
 - ACOUSTICS**
 - SURFACE DECORATION**
 - RUBBER REPLACEMENT(TPVs IN BODY SEALS)**
- **RECYCLING - NOT U.S. DRIVER, SIGNIFICANT EUROPE DRIVER**
- **EURO/NAFTA USE PATTERN WILL CONVERGE**

ABOUT ROBERT ELLER ASSOCIATES, INC.

- **TECHNICAL, MARKET AND ECONOMIC ANALYSIS IN SUPPORT OF MANAGEMENT DECISION**
- **AUTOMOTIVE – ONE OF SEVERAL SPECIALTIES**
- **OFFICES IN US AND EUROPE**
- **RECENTLY COMPLETED SOFT TRIM MULTICLIENT STUDY**
- **INITIATING AUTO NONWOVENS STUDY**
- **REPRESENTATION IN SPAIN(PROTOMOLD-BARCELONA, protomold@eresmas.com)**