

SAE 2010

Automotive Refrigerant and System Efficiency Symposium

July 13-15, 2010

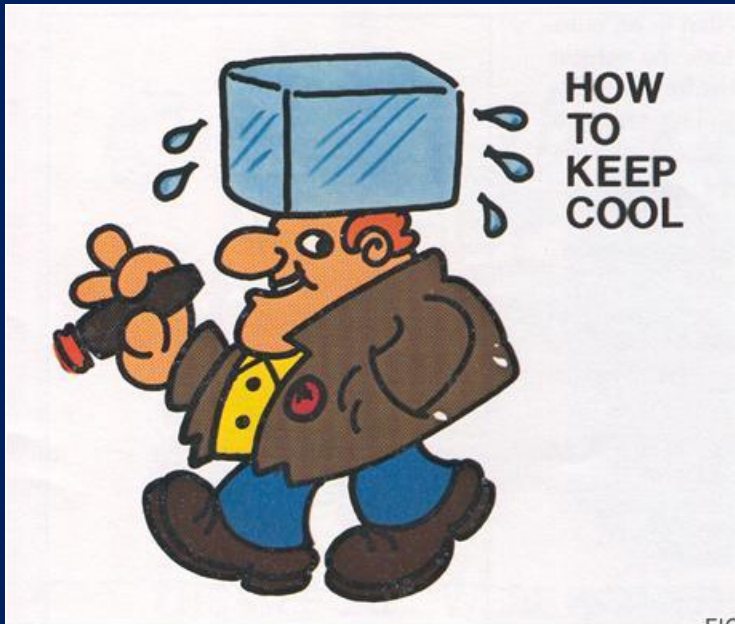
Xona Resort Suites, Scottsdale, Arizona USA

www.sae.org/arss



SAE International

2010 ARSES Meeting



July 13, 2010
Scottsdale, Arizona
Ward Atkinson

The 1998 Reason



**Industry Forum on Mobile
A/C Alternate Refrigerant
Systems
July 15 - 18, 1998**

**The purpose of
the vehicle
comfort ride
evaluation is to
establish
information on
the perceived
customers'
acceptance of
mobile A/C
systems**



Industry Forum on Mobile A/C Alternate Refrigerant Systems July 15 - 18, 1998

Developing Industry Consensus on

1) Refrigerant Emissions Estimate

R134a - Flammables - CO₂

2) A/C Refrigerant System Energy Usage Estimate

R134a - Flammables - CO₂

3) Global / Regional TEWI for Mobile A/C

4) Economic Impact of Mobile A/C TEWI

Effects of A/C system loads on vehicle operation

1) Definition(s) of Air Conditioning Comfort (Global/Regional)

2) Energy Use Versus Load

Industry Forum on Mobile A/C Alternate Refrigerant Systems July 15 - 18, 1998

Design considerations for mobile A/C systems using alternate refrigerants.

Safe Use of Alternate Refrigerants in Motor Vehicles

- 1) Flammables**
- 2) High Pressures**
- 3) Toxicity**
- 4) Service / Servicing Issues**

Assessing and Comparing Alternative Refrigerant Systems

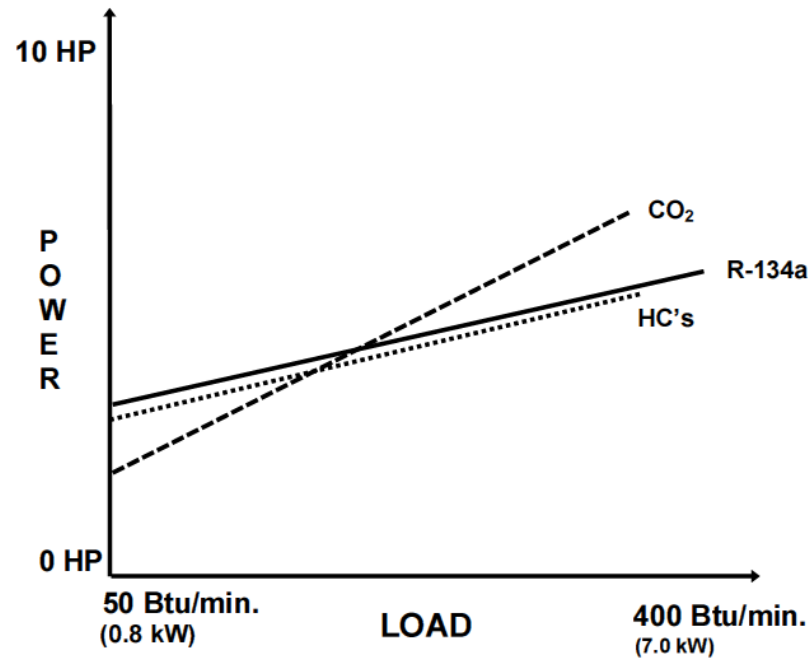
Potential Governmental and/or vehicle system requirements.

- 1) EPA and NHTSA (DOT)**
- 2) Development of Standards (SAE, ISO, etc)**

Industry direction covering the current status of mobile A/C systems and future technology.

1998 Meeting

ENERGY USAGE VS LOAD
(EXAMPLE)



FOR AN HVAC SYSTEM TO BE A
UNIVERSAL SYSTEM, IT HAS TO
PERFORM OVER THE FULL RANGE OF
EXPECTED LOADS (Up to 400 Btu/min)

1998 Technical Sessions



1998 Energy Consumption



1998 Phoenix Group Future Actions

Present Phoenix results at the 1998 Earth
Technologies Forum

October 26-28, 1998 in Washington, D.C.

- Phoenix Group Consensus

 - MACS Global Warming Scenarios

 - Comfort Ride Results

 - Technology Status - Future Needs

Move Phoenix Group Efforts to the SAE

Interior Climate Control Standards Committee

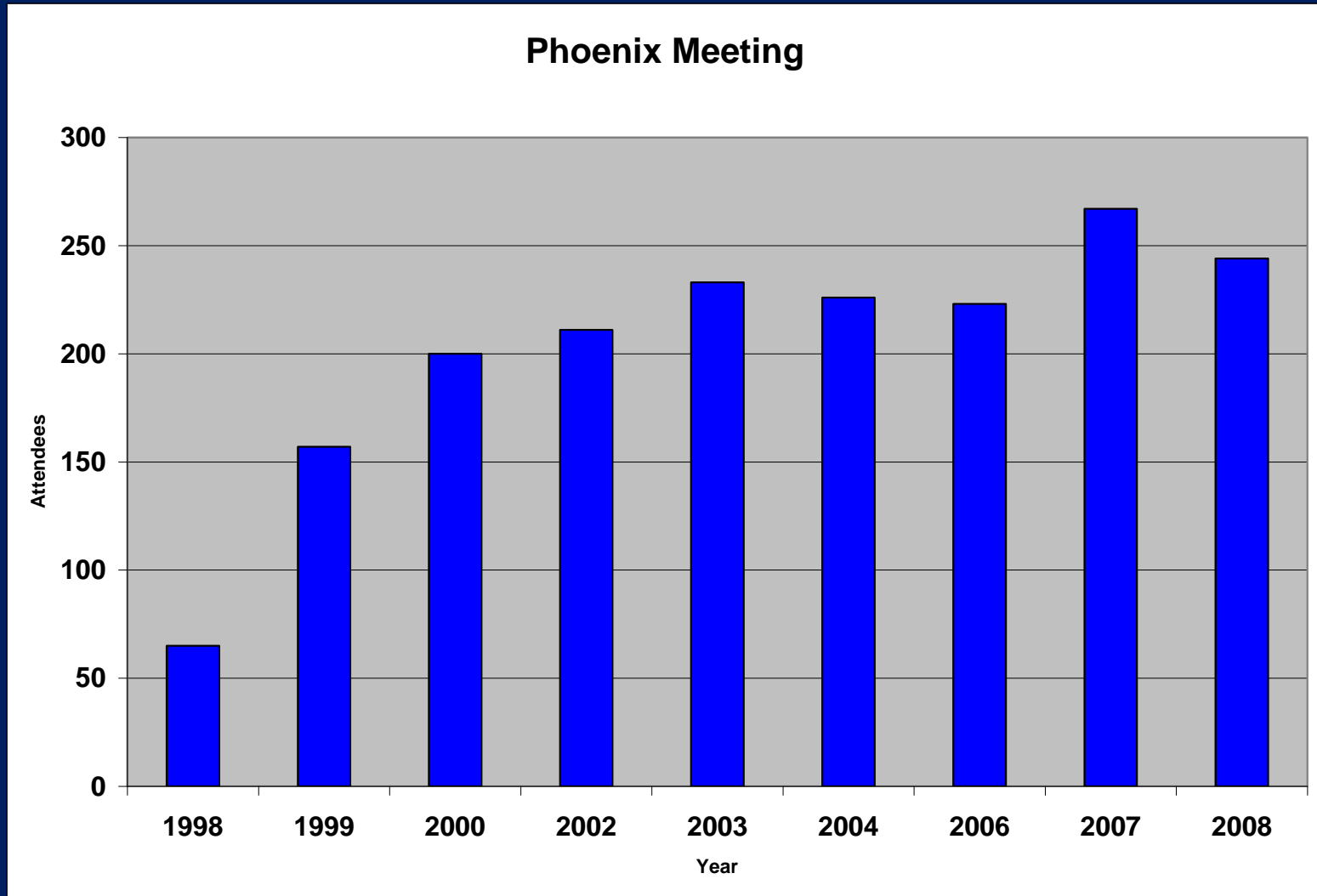
- Assemble Sub-Committee

 - Standards Development (SAE/ISO)

 - Forum to Monitor Technology Status

- Future Meetings as SAE Sub-Committee

Meeting Attendance



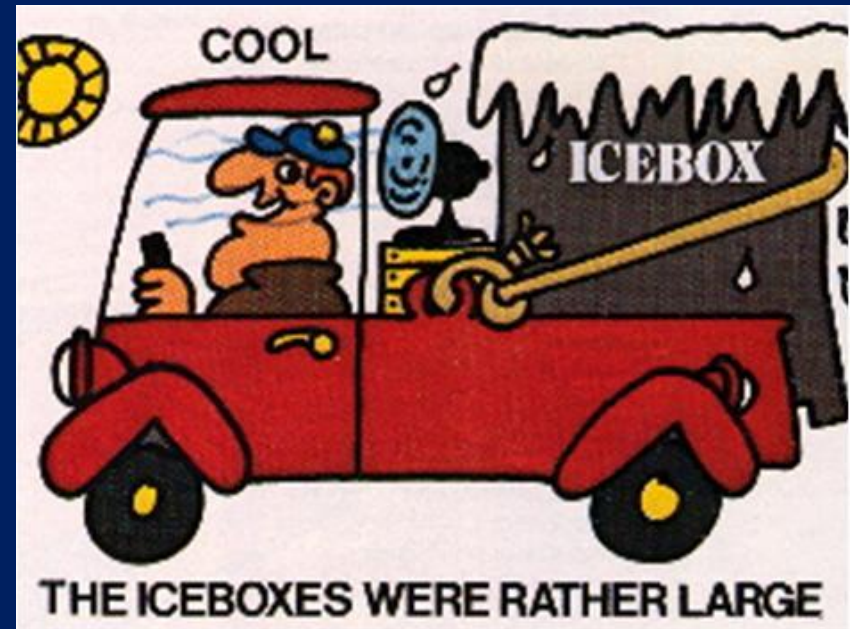
The Old Days

- People traveling in the southern parts of the United States on hot days in the 1920's held cold water melons in their laps to keep cool



MAC ECONO System

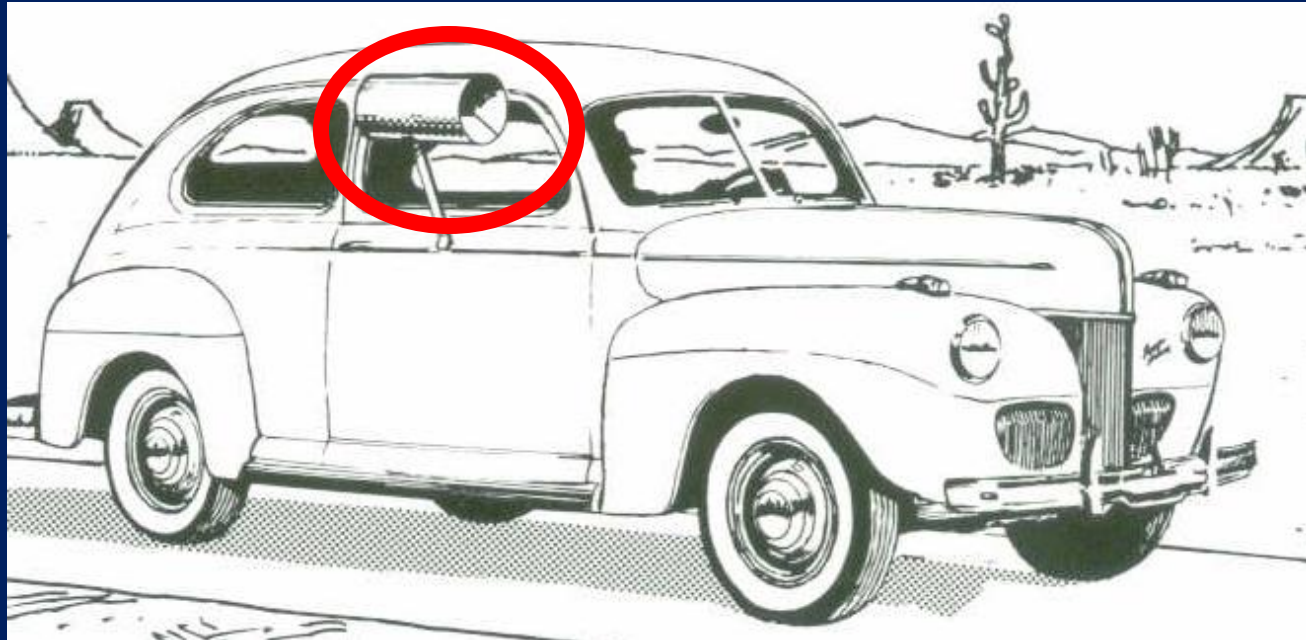
- Cooling with an icebox and circulation of air
 - Requirement for a 40 C day
 - Requires 90.8 kg of ice per hour to cool
 - Six-hour trip
 - Question how to carry 544.8 kg of ice?



MAC ECONO System

Early attempts
to cool

Evaporative
water cooler
mounted in
the side
window
opening



SAE 2010

Automotive Refrigerant and System Efficiency Symposium

July 13-15, 2010

Xona Resort Suites, Scottsdale, Arizona USA

www.sae.org/arss



SAE International

- **On April 21, 2010 requested vehicles for Ride Evaluation Program**
 - Production Hybrid
 - New electric
 - New concepts
- **Only one OEM offered a vehicle**

2003 Phx. Workshop Risk Assessment

A/C System Choice	1 Rupture	2 Service areas (Garage, Assembly, Disassembly, Devel)	3 Passenger Exposure	Cost	Time Table
HFC-134a	Baseline	Baseline	Baseline	Baseline	Baseline
Improved HFC-134a	No change	No change	No change	No change	No change
HFC-152a	No change	Training Venting Sensors Electrical Service Equip std	Risk assessment under way-	++	Sept, 2003
Secondary Loop	Safety valve for 2ndary loop	Training Venting Sensors Electrical Service Equip std	Risk assessment under way	+++	Sept, 2003
CO ₂	Energy equiv to baseline	Training Venting Sensors Service Equip No recovery	Risk assessment under way	+	Sept, 2003

SAE 2010

Automotive Refrigerant and System Efficiency Symposium

July 13-15, 2010

Xona Resort Suites, Scottsdale, Arizona USA

www.sae.org/arss



SAE International

Phoenix Comfort Evaluation 2 dr. Specialty & 4 dr. Sedan Vehicles

