



NWPMA 2012 Conference

October 23rd - 26th

"Paving It Forward!"

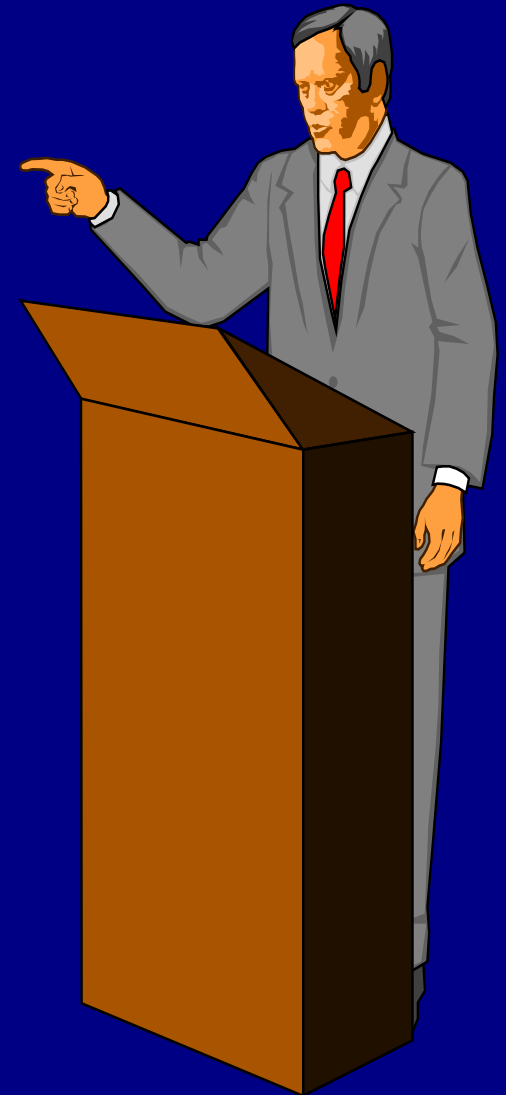
Vancouver Washington

**REINVENTING THE
(PAVEMENT MANAGEMENT)
WHEEL**

**Ralph Haas
University of Waterloo**

PRESENTATION

- ◆ Reinventing the wheel?
- ◆ Role of PM Conferences
- ◆ Evolution of PM: advances, successes and big issues
- ◆ Toward sustainability in life cycle management
- ◆ Future of pavement management
- ◆ Ideal PMS of the future



REINVENTING THE (PAVEMENT MANAGEMENT) WHEEL

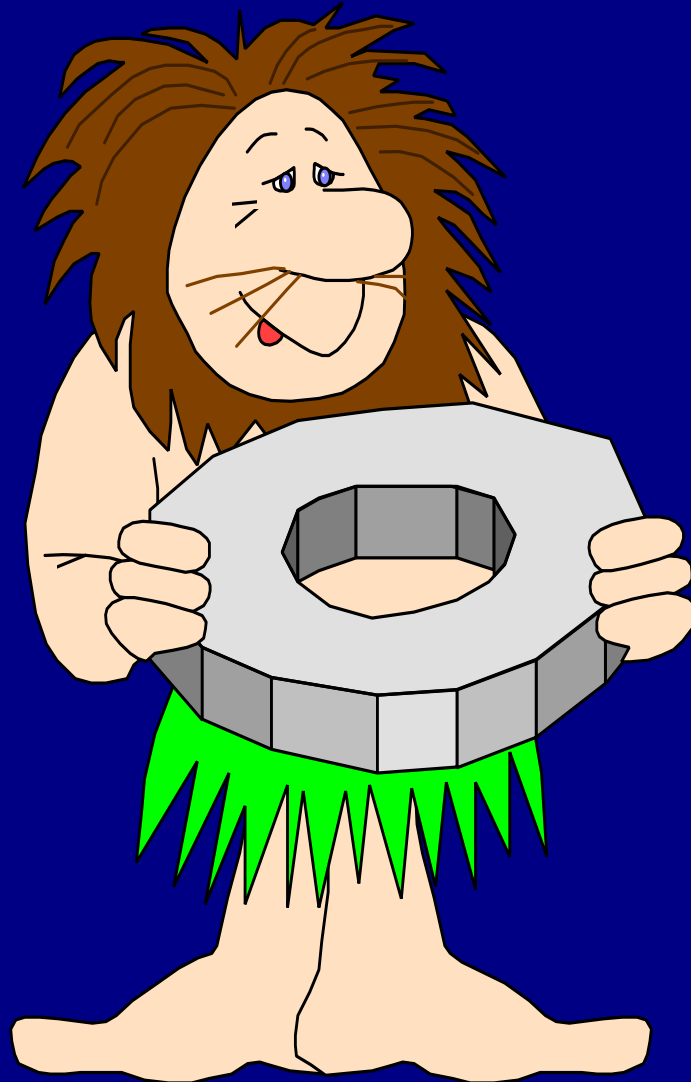


**ISAP Distinguished Lecture
To
Fifth International
Conference on Managing
Pavements**

**Ralph Haas
University of Waterloo**

August 11-13, 2001

REINVENTING THE WHEEL ?



8th International Conference on Managing Pavement Assets

"Fulfilling the Social, Economic and Environmental Responsibility for Sustainable, Well Managed, Better Roads"



15 – 19 November 2011, Santiago - Chile

ENGLISH | ESPAÑOL

Organized By



PONTIFICIA
UNIVERSIDAD
CATÓLICA
DE CHILE



International Host



TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

OPENING PLENARY SESSION

A JOURNEY THROUGH EIGHT ICMPA'S



Ralph Haas
University of Waterloo

- 1985 Toronto**
- 1987 Toronto**
- 1994 San Antonio**
- 1998 Durban**
- 2001 Seattle**
- 2004 Brisbane**
- 2008 Calgary**
- 2011 Santiago**

AND COUNTING

2014 TBA

ACCOMPLISHMENTS

1985 Toronto

1987 Toronto

1994 San Antonio

1998 Durban

2001 Seattle

2004 Brisbane

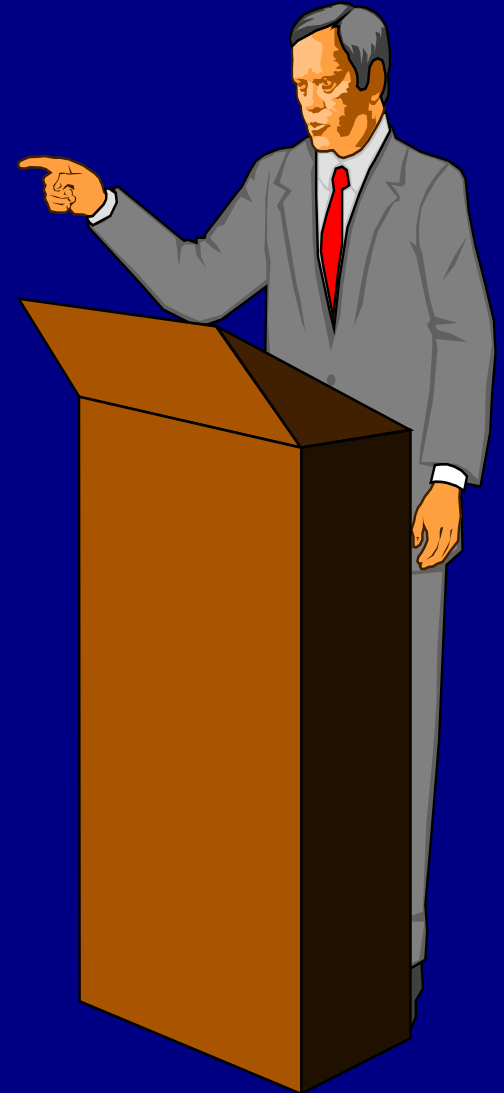
2008 Calgary

2011 Santiago

- ◆ Unparalleled, documented record and achievements, advances and implementation of PMS's
- ◆ Clear verification of PMS return on investment
- ◆ Education and training of many, many people
- ◆ Buy in of PMS world wide
- ◆ A legacy for the future

PRESENTATION

- ◆ Reinventing the wheel?
- ◆ Role of PM Conferences
- ◆ **Evolution of PM: advances, successes and big issues**
- ◆ Toward sustainability in life cycle management
- ◆ Future of pavement management
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EVOLUTION OF AND FUTURE CHALLENGES FOR PAVEMENT MANAGEMENT

Ralph Haas

University of Waterloo

W. Ronald Hudson

Agile Assets, Inc.

Lynne Cowe Falls

University of Calgary

EVOLUTIONARY ADVANCES/INNOVATIONS



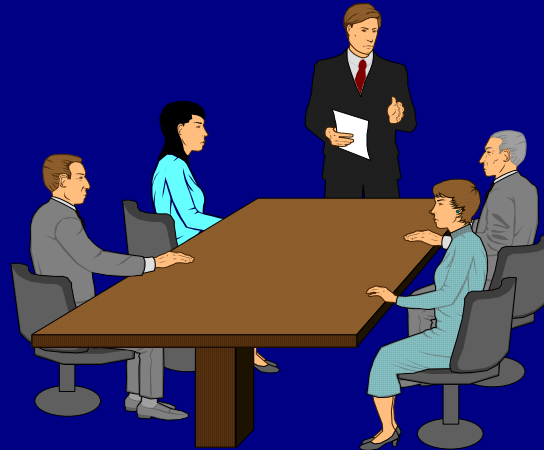
Use of GIS, web based data and models, dynamic sectioning, etc.

All encompassing management framework

High speed, automated data capture and surveillance

Improved validation of models

Integration of asset and pavement management



Influence on bridge, maintenance and safety management

Extensive LTTP Data Base

Pavement preservation through preventive and rehabilitation maintenance

Long term performance based contracts



LEGACY / SUCCESS FACTORS

Understanding of technical, economical and institutional needs

Understanding of best practices, driving forces and challenges

Products which serve users

Leadership and Commitment



Succession planning is essential

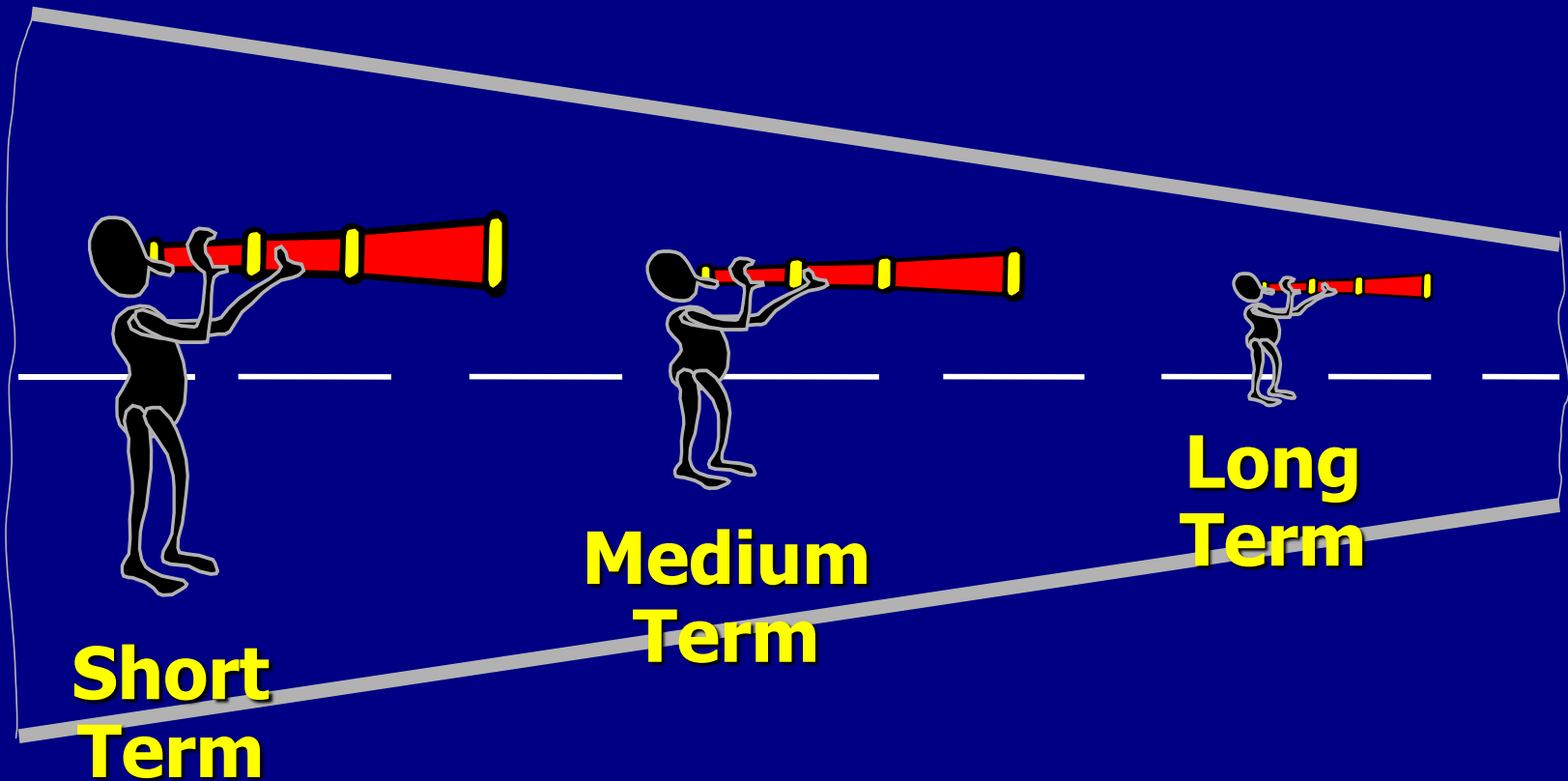
Comprehensive Framework

Acquisition of data and information

Broadly based team and life cycle approach

Acceptance of risk

LOOKING FORWARD



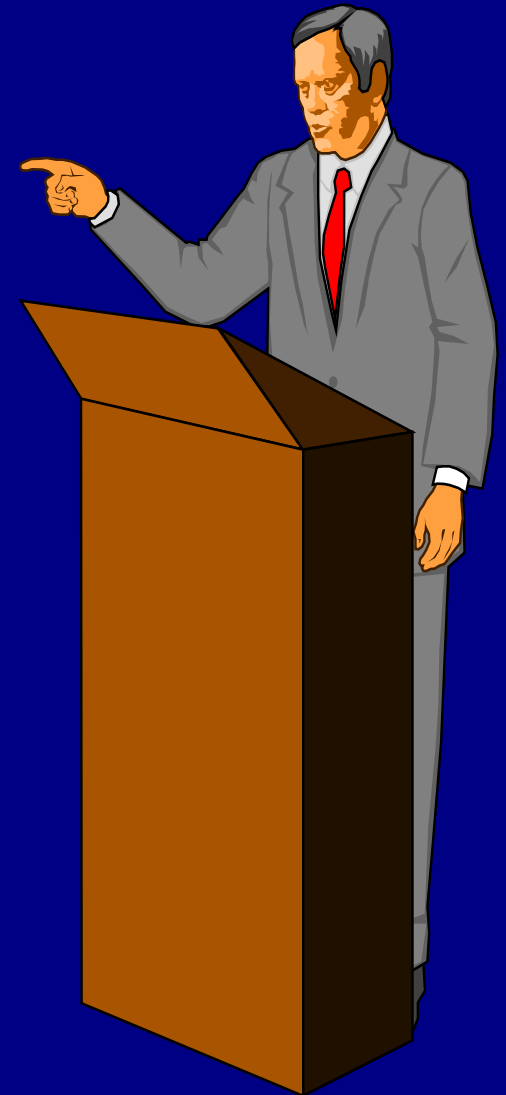
**Some Big Issues and Challenges
but also Opportunities**

LOOKING FORWARD: SOME BIG ISSUES

- ◆ **ENVIRONMENTAL** – energy efficiencies, achieving “green roads”, successive generations of recycling
- ◆ **SOCIAL** – next generation of leaders, stability of research support
- ◆ **PUBLIC POLICY** – backlog of maintenance and rehabilitation, measurable performance indicators for research
- ◆ **TECHNICAL** – basic material properties ↔ design and performance, real time remote sensing, MEPDG calibration
- ◆ **ECONOMIC** – long term life cycle analysis for costs, benefits, resource conservation, environmental impacts, etc.

PRESENTATION

- ◆ Reinventing the wheel?
- ◆ Role of PM Conferences
- ◆ Evolution of PM: advances, successes and big issues
- ◆ **Toward sustainability in life cycle management**
- ◆ Future of pavement management
- ◆ Ideal PMS of the future



JUNE 6 - 9 JUIN 2012

CONFERENCE
CONGRÈS **2012 EDMONTON**

LEADERSHIP IN SUSTAINABLE INFRASTRUCTURE
LEADERSHIP EN INFRASTRUCTURES DURABLES



FOUNDED
FONDÉ 1887 | 125 YEARS
ANNÉES

Toward Sustainability in Life Cycle Management of Road Assets



Ralph Haas
University of Waterloo

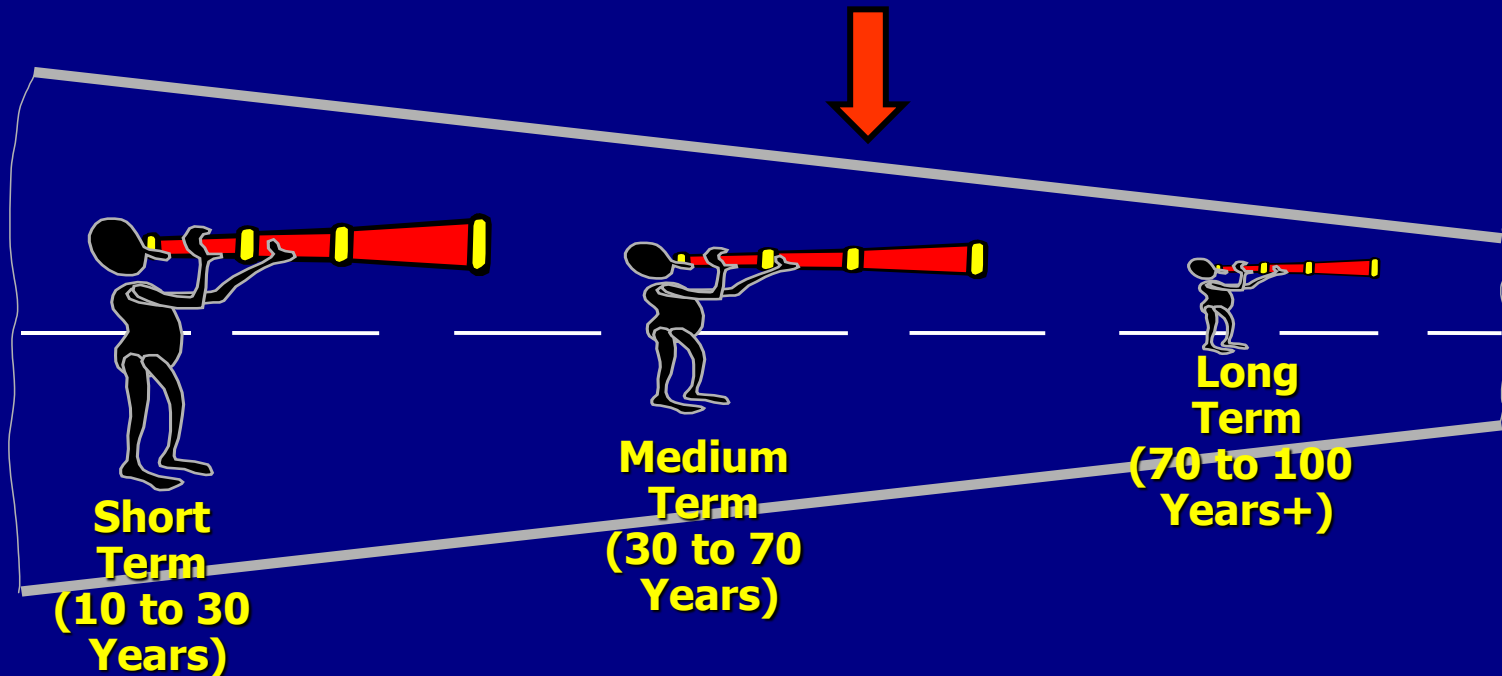
Lynne Cowe Falls
University of Calgary



What is Sustainable Transportation

..... A balance between transportation's economic and social benefits vs. the need to protect the environment

Simply put - **Do things today that don't Screw up the Future**





Green Roads

more sustainable roads for a better transportation future

Green Roads is a rating system designed to distinguish high-performance sustainable new or redesigned/rehabilitated roads.

It awards credits for approved sustainable choices/practices and can be used to certify projects based on point value.



BUT Being Green Isn't Enough !

**Sustainability Has Additional Dimensions
(and Beware the "Snake Oil")**

Green 'drivel'

The godfather of global warming lowers the boom on climate change hysteria

Two months ago, James Lovelock, the godfather of global warming, gave a startling interview to msnbc.com in which he acknowledged he had been unduly "alarmist" about climate change.

The implications were extraordinary.

Lovelock is a world-renowned scientist and environmentalist whose Gaia theory — that the Earth operates as a single, living organism — has had a profound impact on the development of global warming theory.

Unlike many "environmentalists," who have degrees in political science, Lovelock, until his recent retirement at age 92, was a much-honoured working scientist and academic.

His inventions have been used by NASA, among many other scientific organizations.

Lovelock's invention of the electron capture detector in 1957 first enabled scientists to measure CFCs (chlorofluorocarbons) and other pollutants in the atmosphere, leading, in many ways, to the birth of the modern environmental movement.

Having observed that global temperatures since the turn of the millennium have not gone up in the way computer-based climate models predicted, Lovelock acknowl-



LORRIE
GOLDSTEIN

Associate Editor

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📧 @sunlorrie

edged, "the problem is we don't know what the climate is doing. We thought we knew 20 years ago." Now, Lovelock has given a follow-up interview to the UK's *Guardian* newspaper in which he delivers more bombshells sure to anger the global green movement, which for years worshipped his Gaia theory and apocalyptic predictions that billions would die from man-made climate change by the end of this century.

Lower emissions

Lovelock still believes anthropogenic global warming is occurring and that mankind must lower its greenhouse gas emissions, but says it's now clear the doomsday predictions, including his own (and Al Gore's) were incorrect.

He responds to attacks on his revised views by noting that, unlike many climate sci-



James Lovelock is a world-renowned scientist and environmentalist.

entists who fear a loss of government funding if they admit error, as a freelance scientist, he's never been afraid to revise his theories in the face of new evidence. Indeed, that's how science advances.

Among his observations to the *Guardian*:

(1) A long-time supporter of nuclear power as a way to lower greenhouse gas emissions, which has made him unpopular with environmen-

talists, Lovelock has now come out in favour of natural gas fracking (which environmentalists also oppose), as a low-polluting alternative to coal.

As Lovelock observes, "Gas is almost a give-away in the U.S. at the moment. They've gone for fracking in a big way. This is what makes me very cross with the greens for trying to knock it ... Let's be pragmatic and sensible and get

Britain to switch everything to methane. We should be going mad on it." (Kan-Jeh Yumkella, co-head of a major United Nations program on sustainable energy, made similar arguments last week at a UN environmental conference in Rio de Janeiro, advocating the development of conventional and unconventional natural gas resources as a way to reduce deforestation and save millions of lives in the Third

World.)

(2) Lovelock blasted greens for treating global warming like a religion.

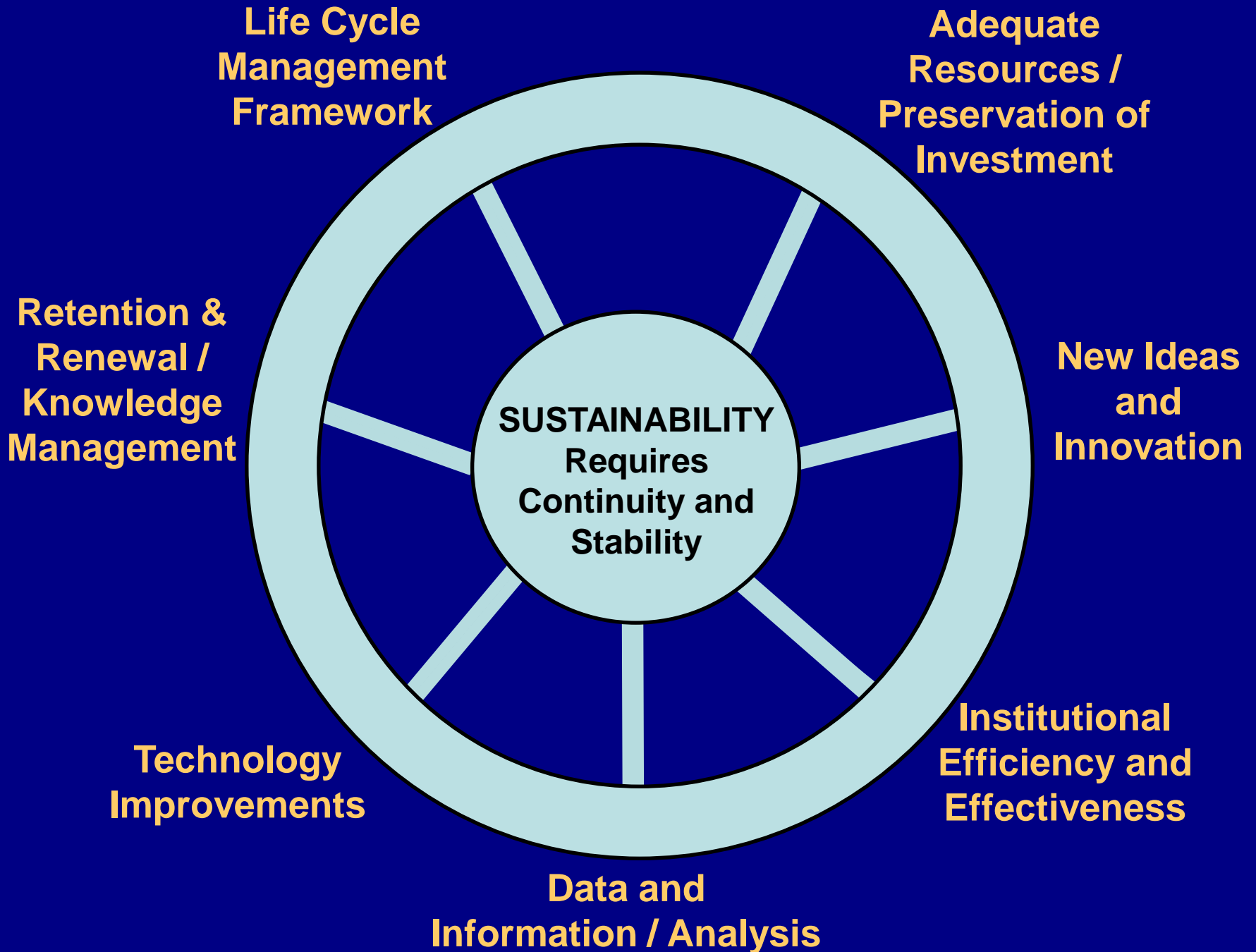
"It just so happens that the green religion is now taking over from the Christian religion," Lovelock observed. "I don't think people have noticed that, but it's got all the sort of terms that religions use ... The greens use guilt. That just shows how religious greens are. You can't win people round by saying they are guilty for putting (carbon dioxide) in the air."

(3) Lovelock mocks the idea modern economies can be powered by wind turbines.

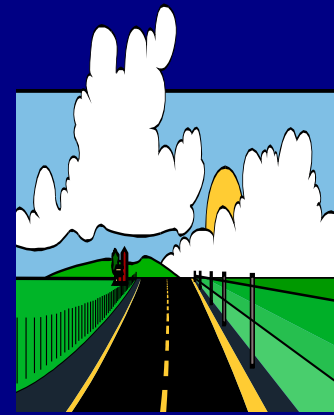
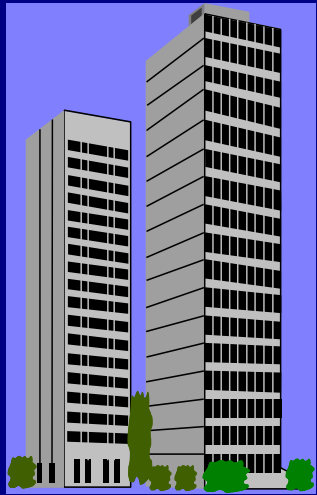
'Hopelessly inefficient'

As he puts it, "so-called 'sustainable development' ... is meaningless drivel ... We rushed into renewable energy without any thought. The schemes are largely hopelessly inefficient and unpleasant. I personally can't stand windmills at any price."

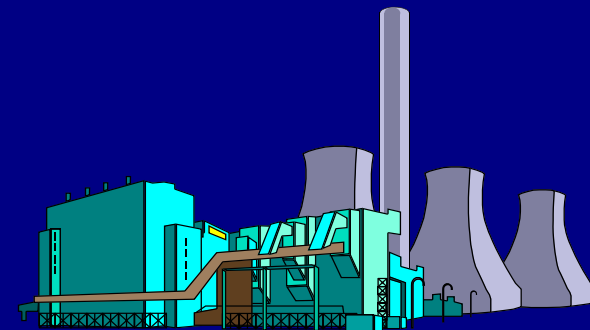
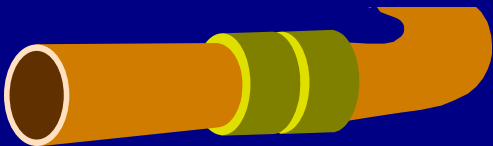
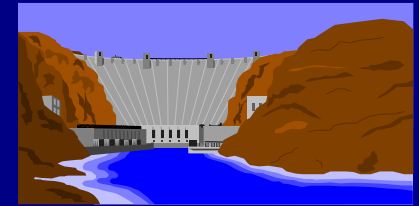
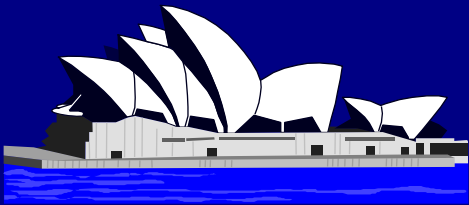
(4) Finally, about claims "the science is settled" on global warming: "One thing that being a scientist has taught me is that you can never be certain about anything. You never know the truth. You can only approach it and hope to get a bit nearer to it each time. You iterate towards the truth. You don't know it."



LIFE CYCLE LEVELS OF ASSET MANAGEMENT

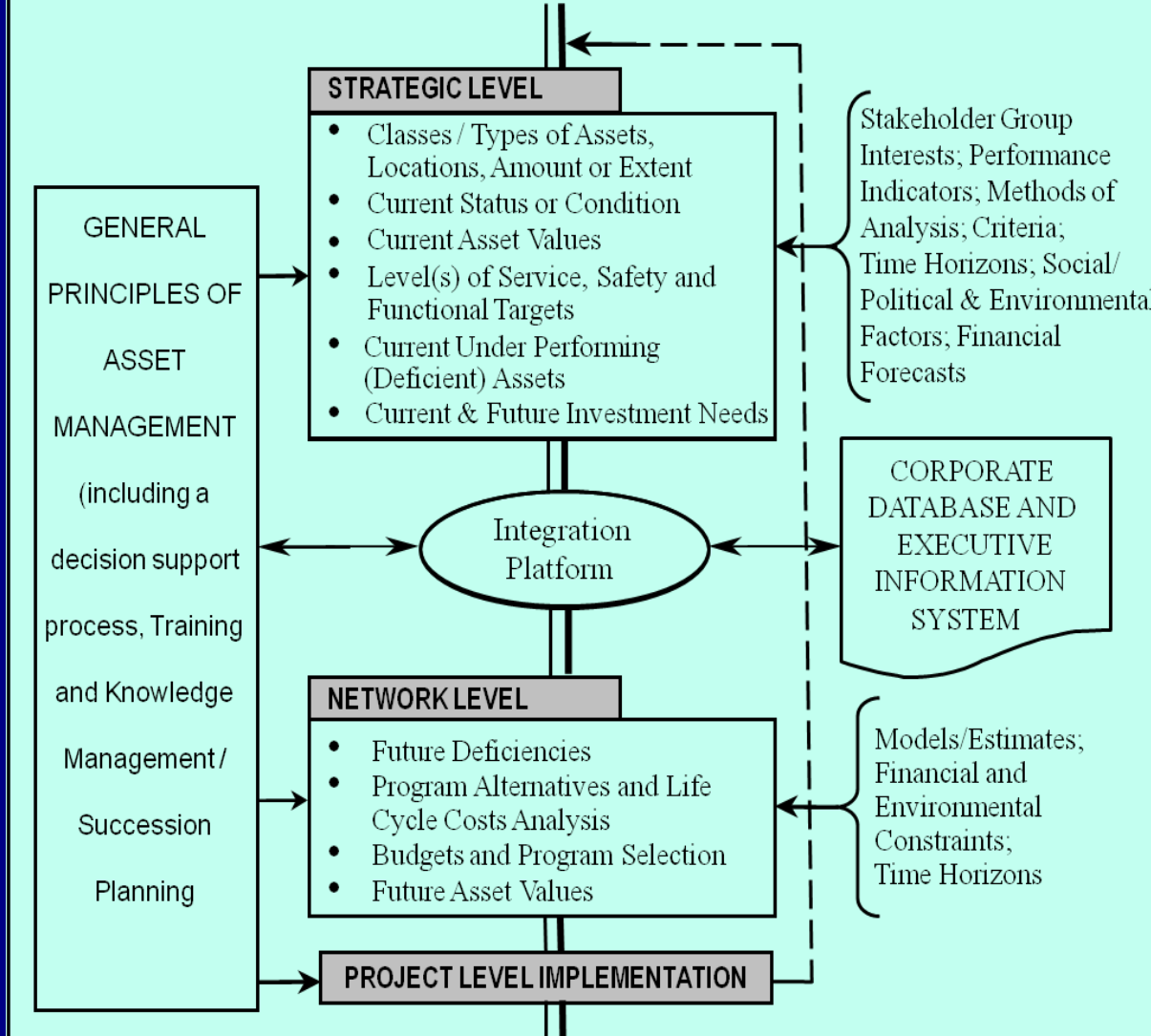


- ◆ Strategic level
- ◆ Network / system wide level
- ◆ Project / site specific level

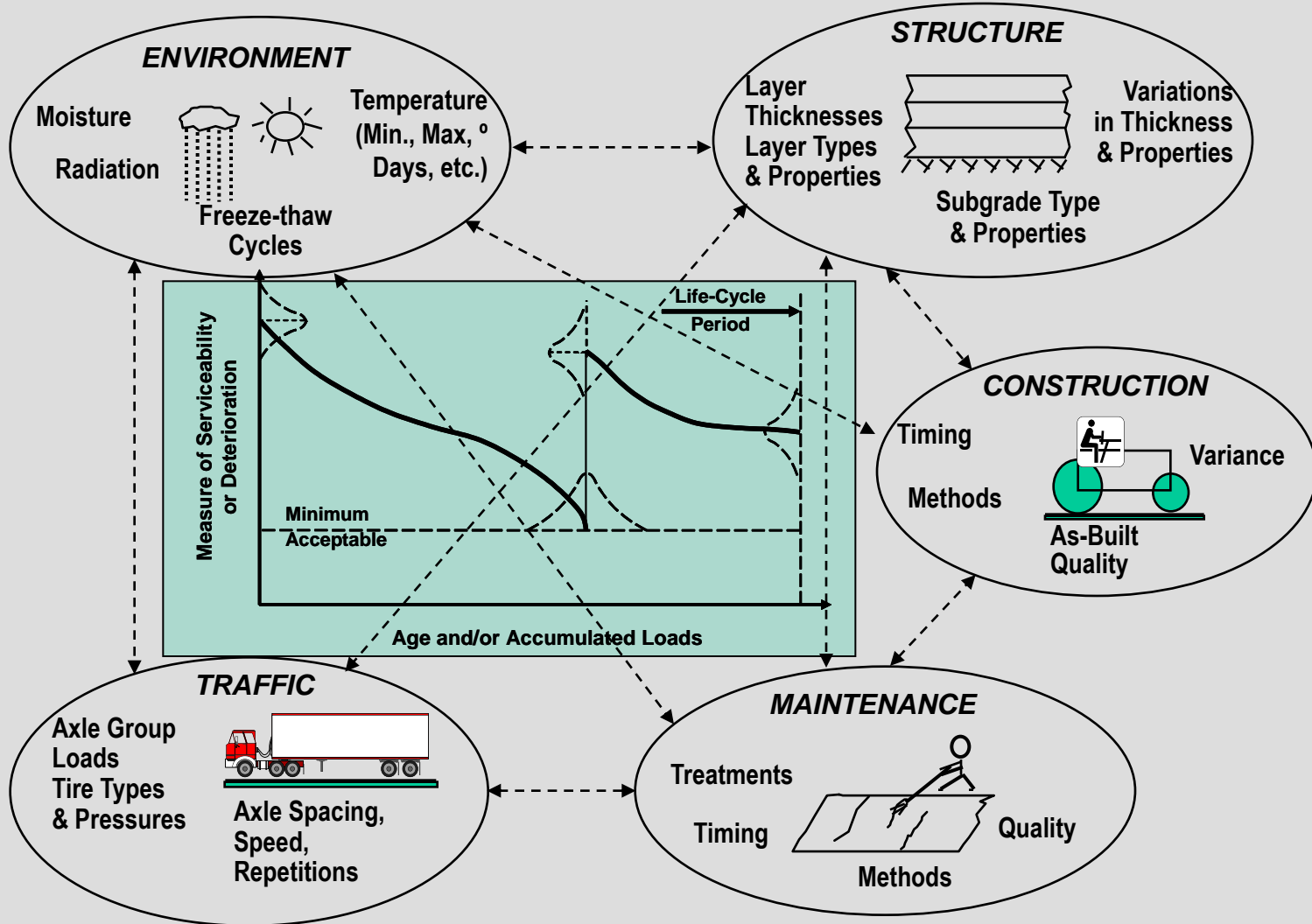


ASSET MANAGEMENT

ROAD AUTHORITY BUSINESS PLAN

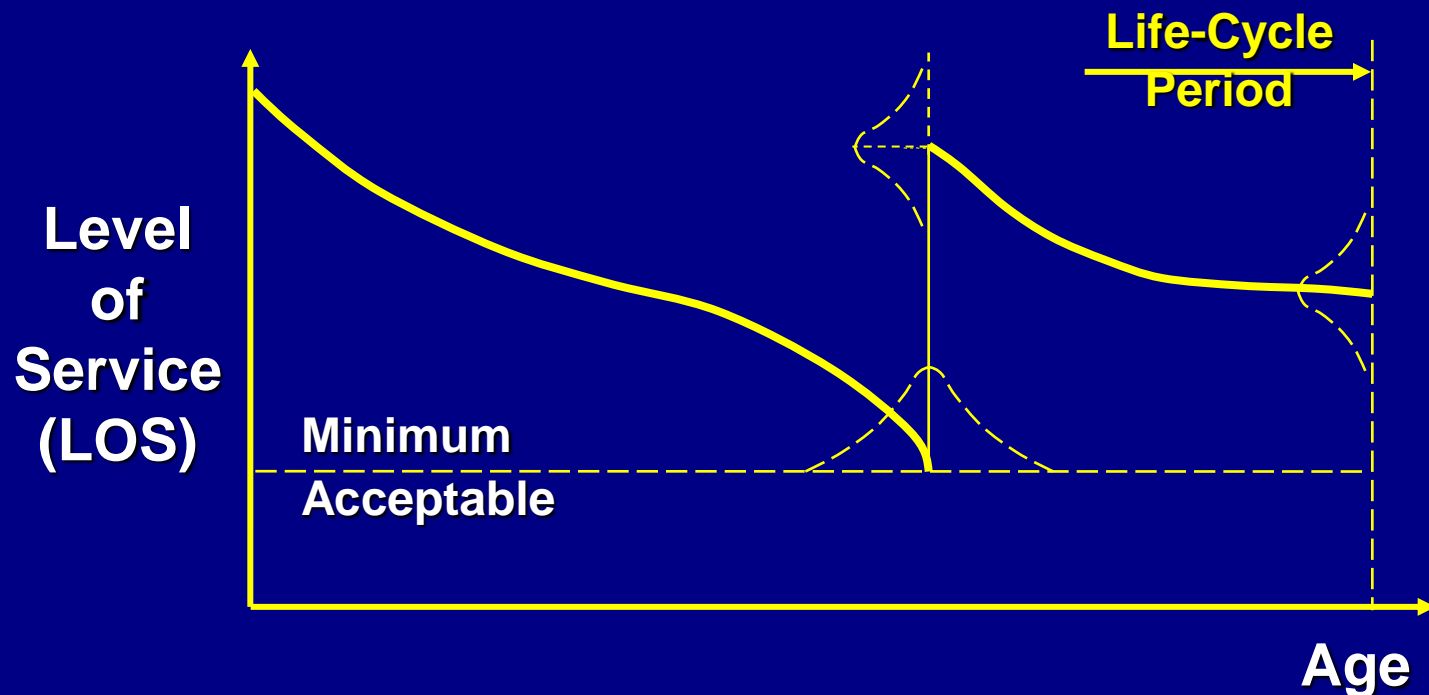


PREDICTING ROAD PERFORMANCE ? A KEY CHALLENGE !



LIFE CYCLE ANALYSIS

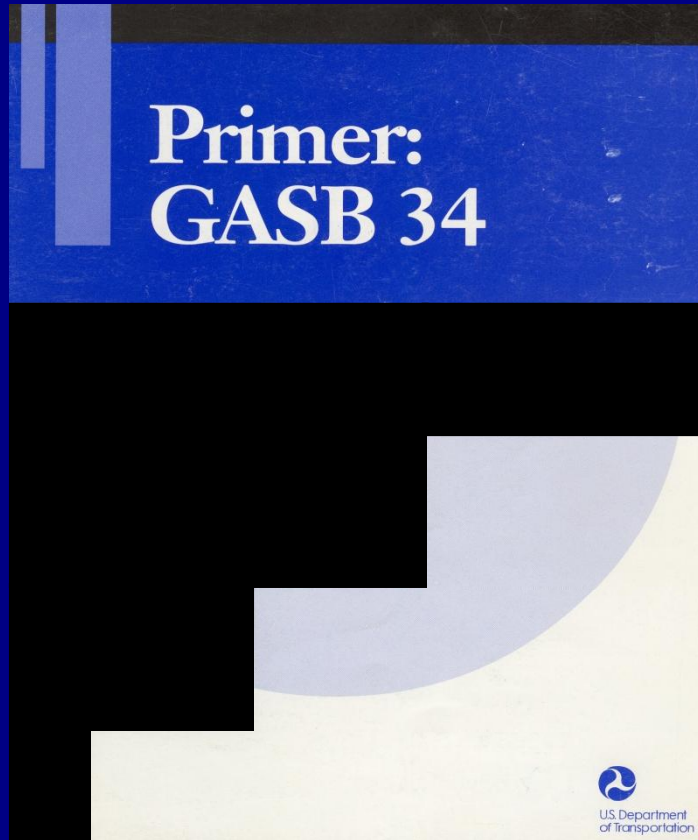
Require: LOS vs Age (Performance) Model
Cost / Cash Flow Calculation (eg. PW)
Asset Value vs Age Calculation
Risk Analysis



MANDATED APPROACHES

U.S.

All U.S.
Municipalities
and States Are
Reporting
Activities /
Expenditures
and Net Assets
By End of 2004



Alternatives

1. Direct Approach
Reporting of
Asset Value
2. Modified Approach
(Reporting
Condition) if
Management
System In Place

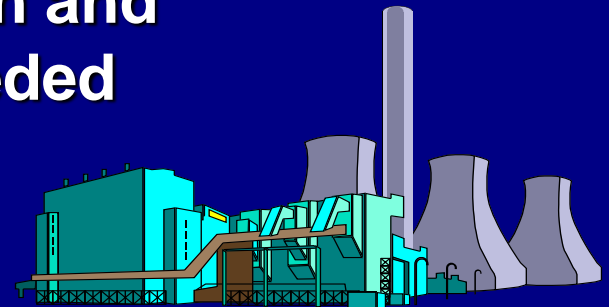
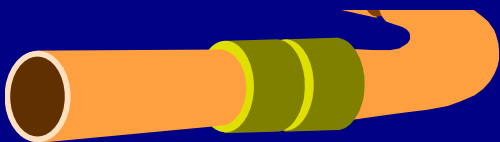
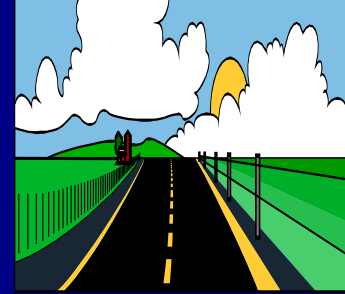
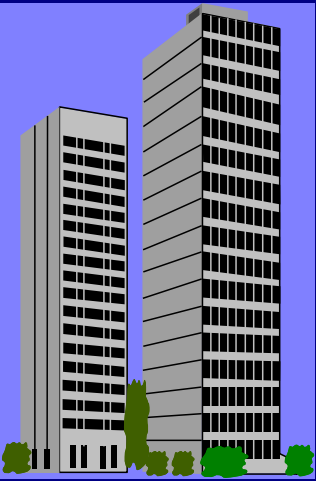
Canada

PSAB Financial Reporting Model (Tangible Assets) -- 2009

VALUATION OF ASSETS

Lessons

- ◆ Wide variation can exist for different methods and different asset classes; cannot generalize
- ◆ GASB34 has major limitations, especially for long life assets
- ◆ Good, long term data is essential
- ◆ Consistency in application and tracking with time are needed



**ADVANCING LIFE CYCLE
MANAGEMENT OF ROAD
ASSETS**

Through

Innovation

and

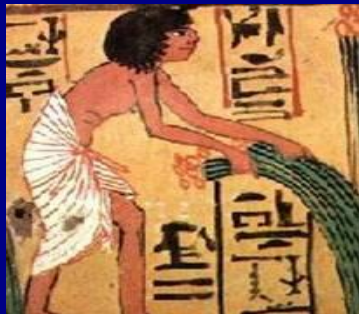
Sustainable Practices

and

Opportunities

INNOVATION: ESSENTIAL TO PROGRESS

PAST



PRESENT



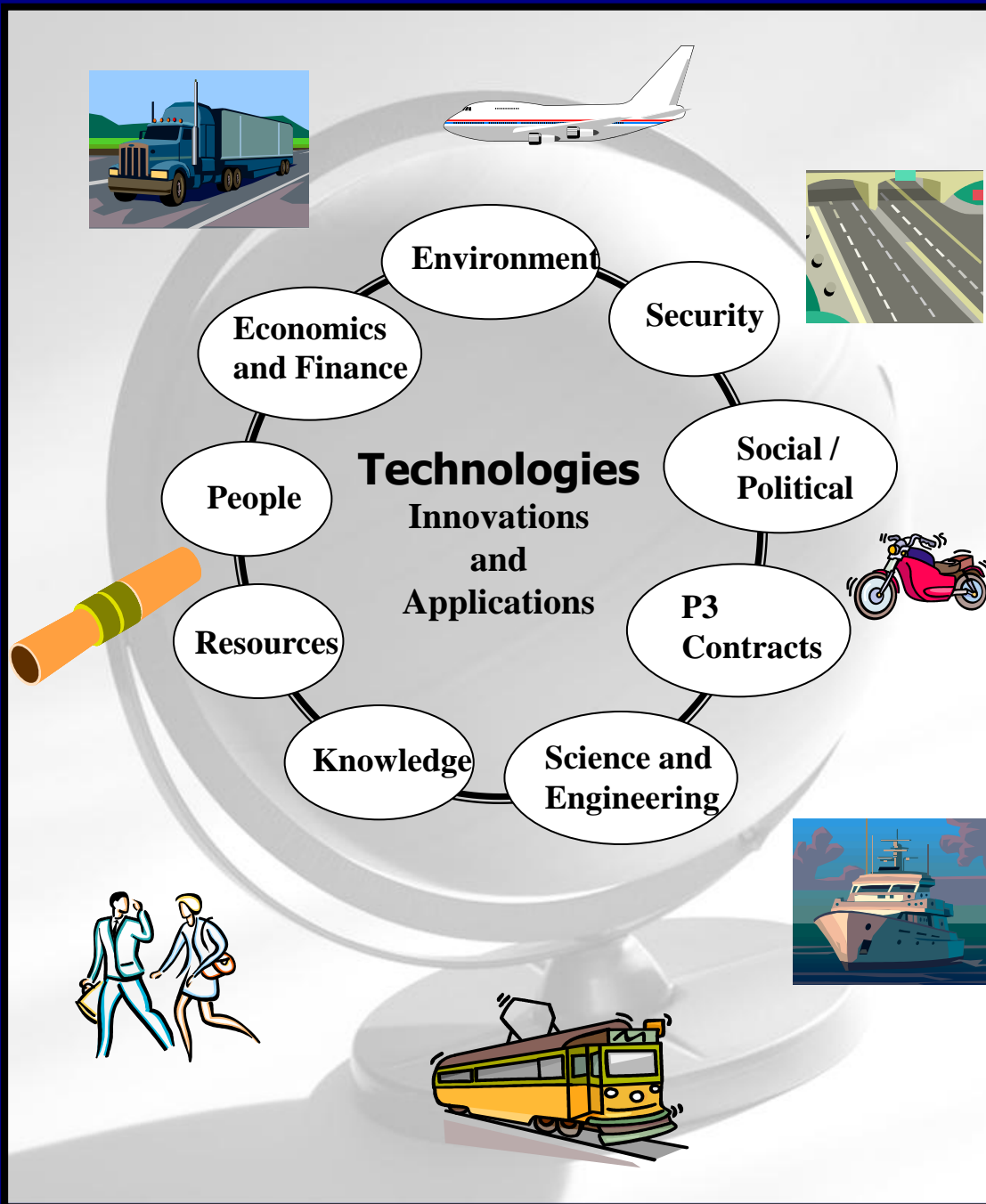
FUTURE



Civil Engineers Build
Infrastructure on Mars



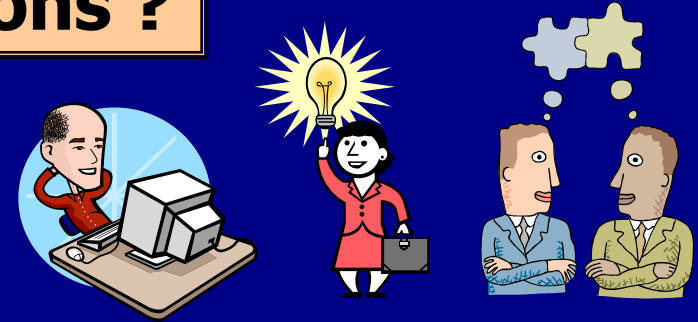
DRIVING FORCES FOR INNOVATION IN TRANSPORTATION INFRASTRUCTURE TECHNOLOGIES



A BIG QUESTION !

Who Comes Up With Innovations ?

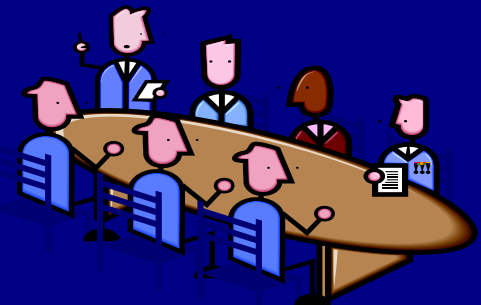
◆ Creative Individuals ?



◆ Organizations ?



◆ Focus Groups ?



or
⋮

?

MOTIVATION & BARRIERS TO INNOVATION

MOTIVATING FACTORS

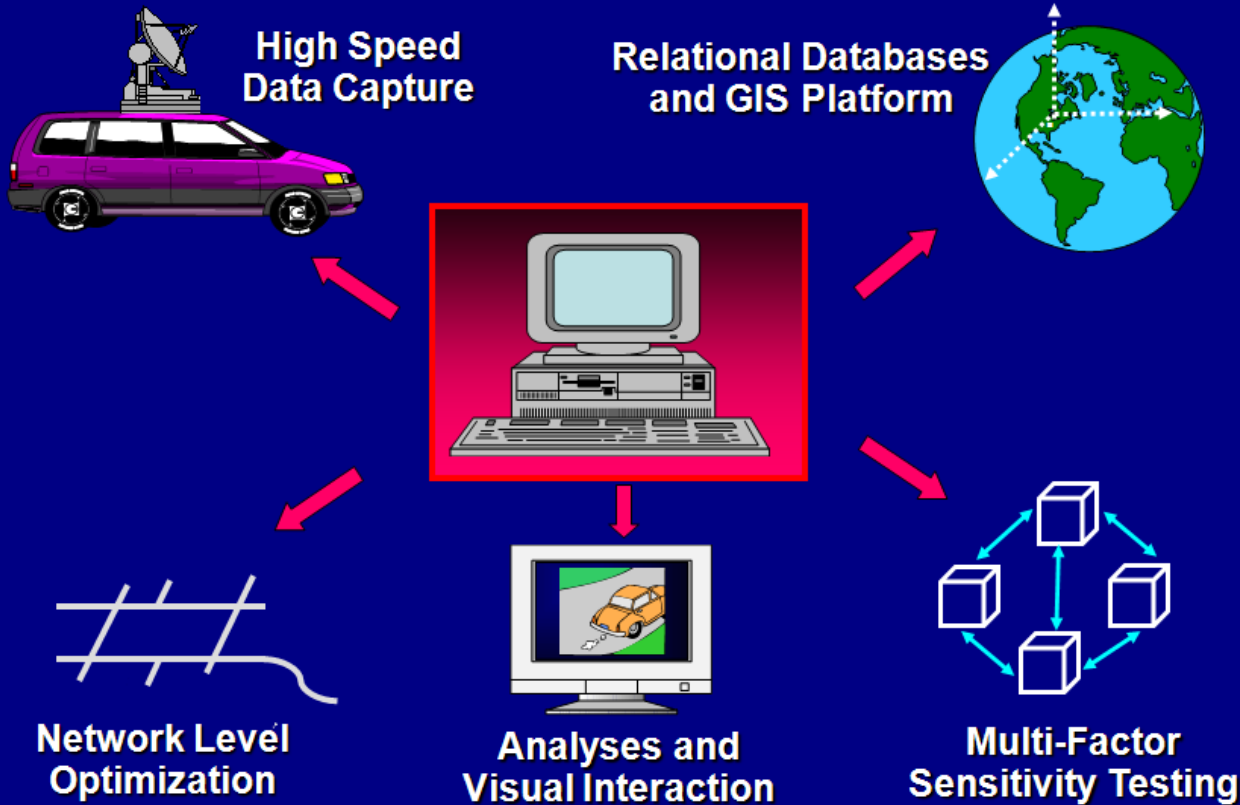
- ◆ Challenging problem
- ◆ Curiosity
- ◆ Improving practice
- ◆ Risk willingness
- ◆ Prospect of reward
- ◆ Industry demand/request
- ◆ Curiosity



BARRIERS

- ◆ Micro Management
- ◆ Short-term outlook
- ◆ Risk averse
- ◆ Institutional inertia
- ◆ Limited resources
- ◆ Comfortable with business as usual

Pavement Technologies

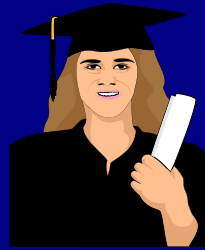


FACTORS

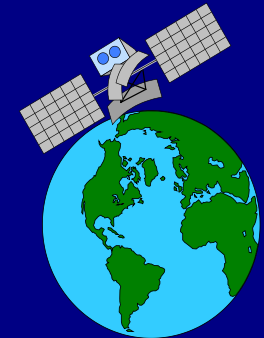
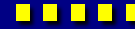
- ◆ High degree of acceptance by users
- ◆ Incorporation of creativity and advanced technologies
- ◆ Major impact
- ◆ Represents a quantum advance
- ◆ New knowledge and skills created
- ◆ Basically, better way of doing things

KNOWLEDGE MANAGEMENT / SUCCESSION PLANNING

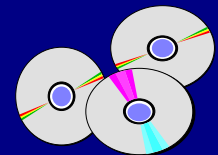
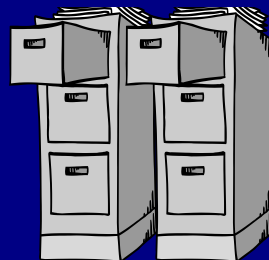
◆ People



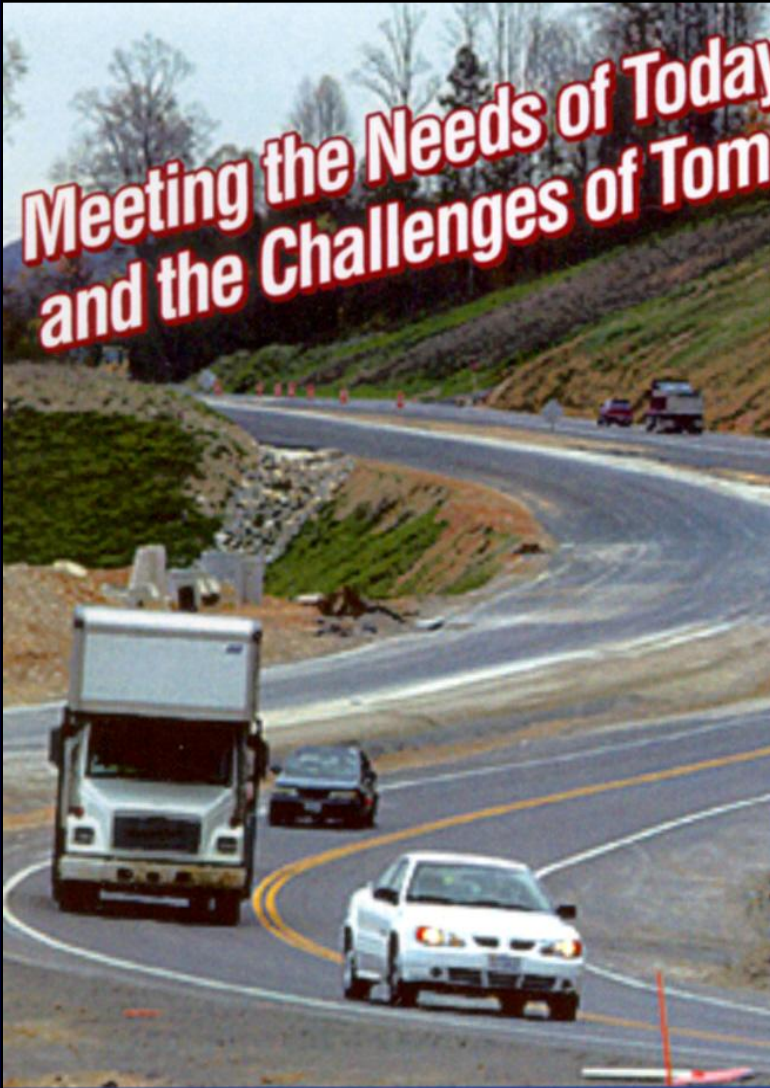
◆ Technology



◆ Data



**Meeting the Needs of Today
and the Challenges of Tomorrow**



07



NATIONAL PAVEMENT MANAGEMENT CONFERENCE

MAY 6-9, 2007

SHERATON NORFOLK WATERSIDE HOTEL, NORFOLK, VA

FUTURE OF PAVEMENT MANAGEMENT SYSTEMS

**By
Ralph Haas**





FUTURE OF PAVEMENT MANAGEMENT

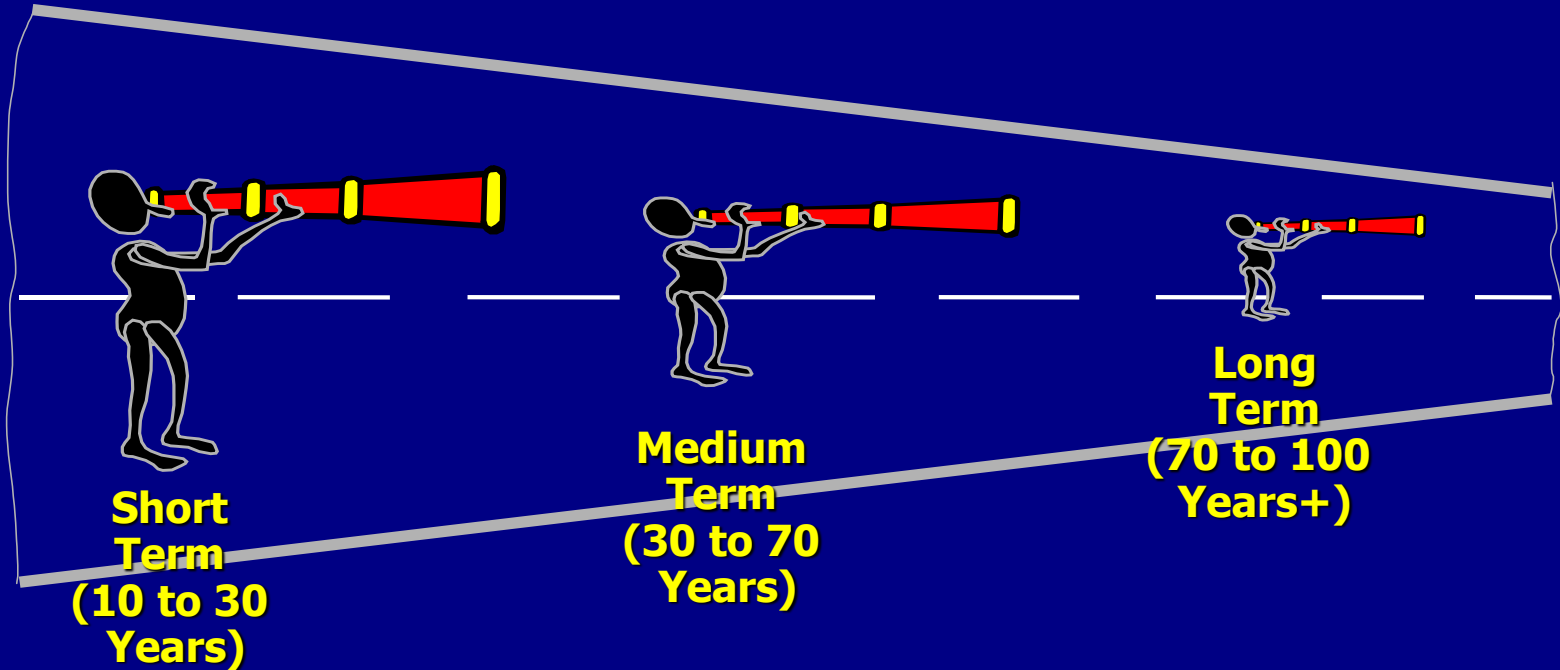
**Does it
Have a
Future?**

**Overriden
By
Asset
Management ?**

**Distinct System
But Integrated
and Continuing
Improvements**

What Will It Look Like ??

FUTURE OF PAVEMENT MANAGEMENT ?



SHORT TERM FUTURE PROSPECTS

Prospect	Likely	Uncertain	Wishful Thinking
● Extensive web-based availability of data and information	Yes	No	No
● Explicit requirements for reporting asset value	Yes	No	No
● Explicit policy objectives tied to measurable performance indicators and implementation targets	?	Yes	No

SHORT TERM FUTURE PROSPECTS

(Continued)

Prospect	Likely	Uncertain	Wishful Thinking
● Comprehensive integration platform tying “silos” together	?	Yes	No
● More P3’s in long term network contracts	Yes	Yes	No
● Incorp. climate change, resource conservation, noise, etc. into PMS	?	Yes	No
● Substantive tech. advances (“Smart” pavements, nanotech. application, etc.)	Yes	No	No

SHORT TERM FUTURE PROSPECTS

(Continued)

Prospect	Likely	Uncertain	Wishful Thinking
<ul style="list-style-type: none">Widespread protocols for valuing PMS's, data bases, risk exposure, etc.	No	Yes	?
<ul style="list-style-type: none">Comprehensive succession planning (people, knowledge and technology)	No	Yes	Yes
<ul style="list-style-type: none">Adequate research funding to advance PMS	No	Yes	Yes
<ul style="list-style-type: none">Clear recognition and encouragement of the leaders of tomorrow	No	Yes	?

IDEAL PMS OF THE FUTURE

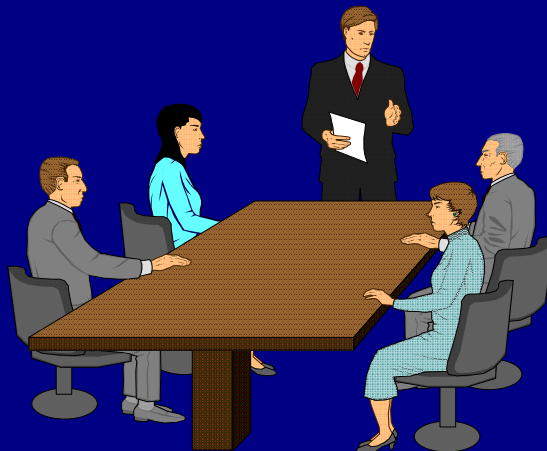


Extensive data base (long term, reliable, used)

Seamless implementation at all levels

Effectively integrated with AMS

Buy-in at all levels to policy objectives and implementation targets



Effective communication with all stakeholders

Explicit incorporation into agency business plan

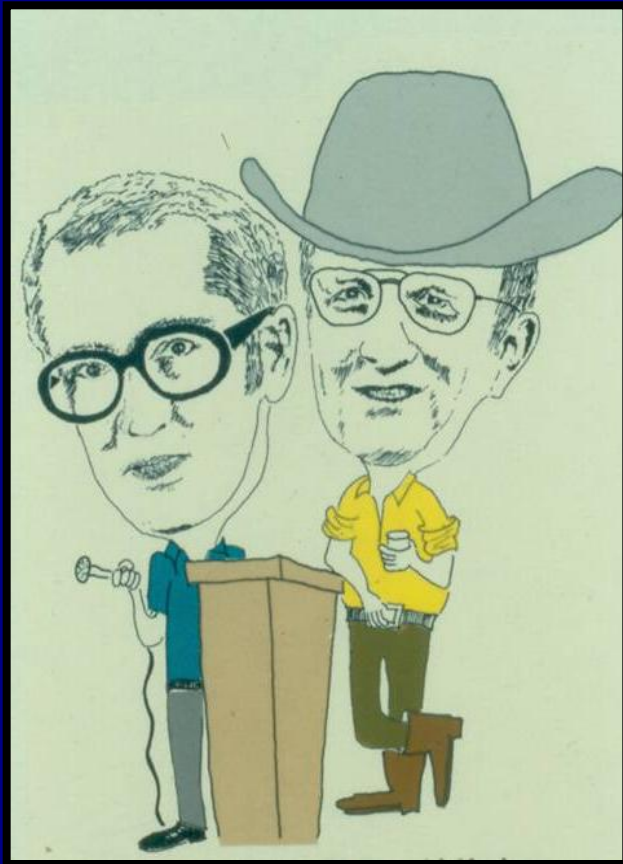
Leadership with commitment to excellence

Provision of resource needs

“Culture” of innovation and advancements



REALIZING A FUTURE FOR PAVEMENT MANAGEMENT



**Four decades ago, there
were people who believed
in the future of pavement
management**

THEY STILL DO IN 2012