Ethics & Engineering Design

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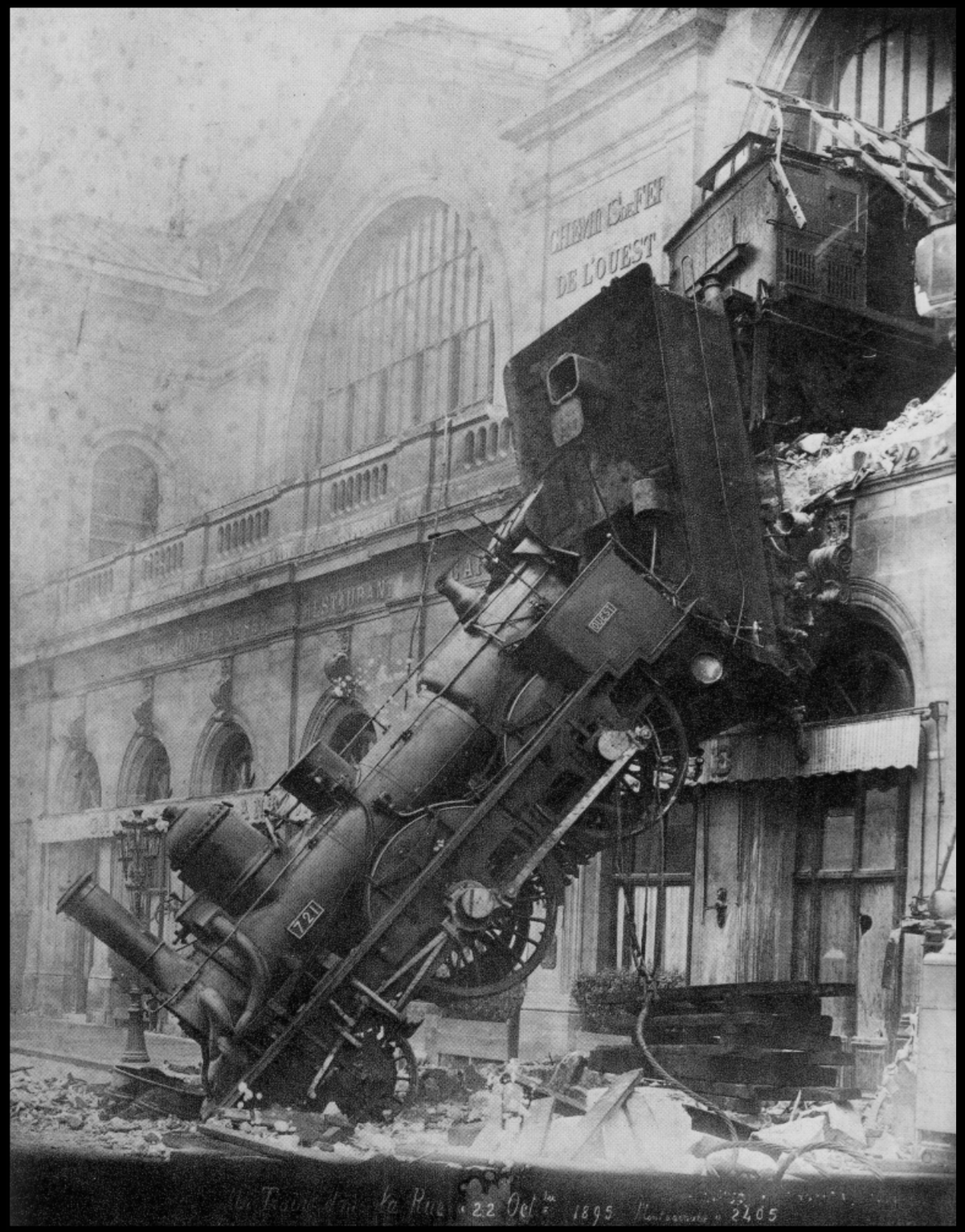
Why Ethics?



Why Ethics?

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- Ethics are essential to a profession

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- CYA

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- Ethics are essential to a profession
- CYA
- Doing the Right Thing

Why Ethics?

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- Ethics are essential to a profession
- CYA
- Doing the Right Thing
- Ethical engineering is good engineering

ABET Criteria I.C.3.d.3.c

- Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation…

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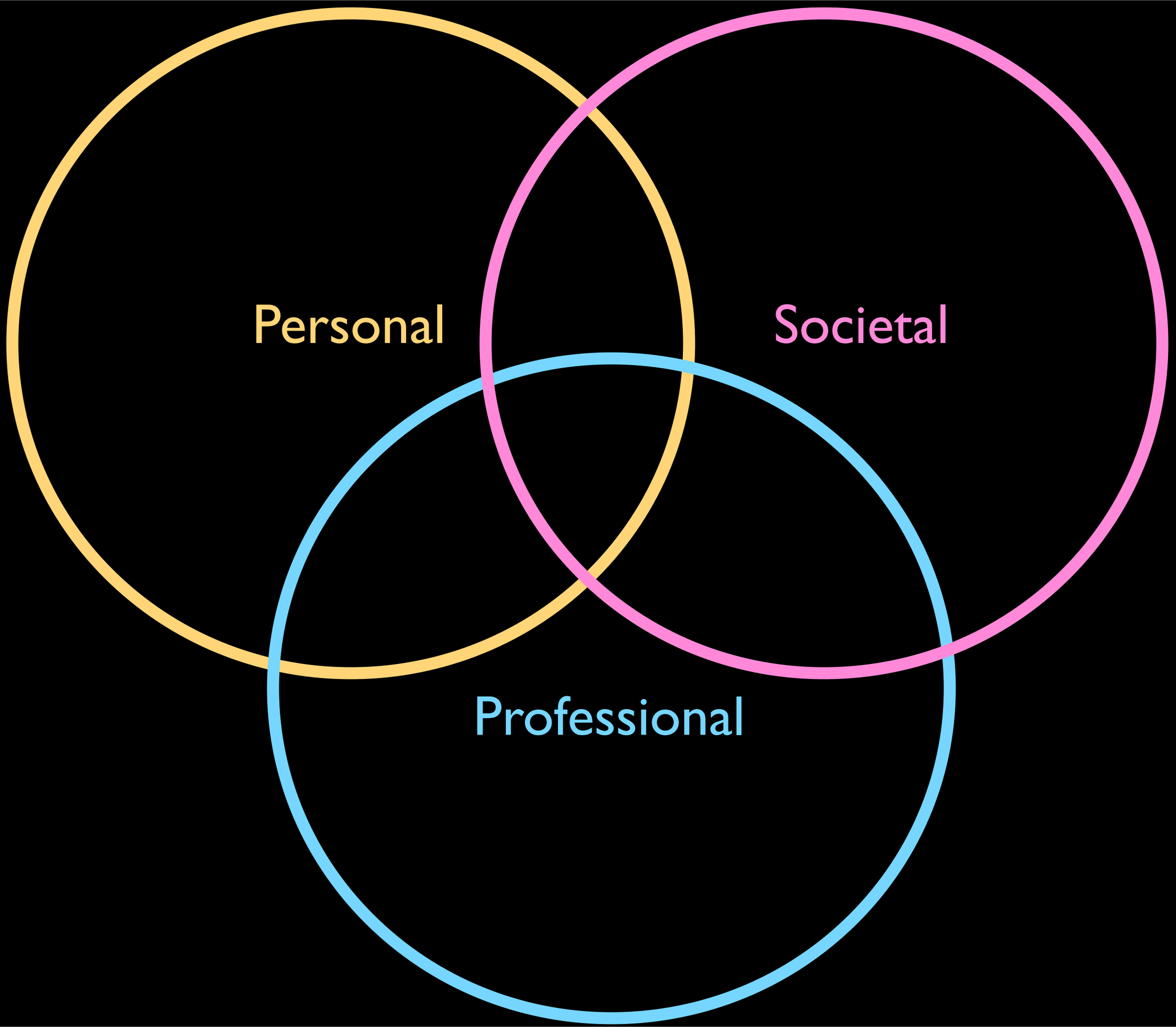
- Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation…

- Further, it is essential to include a variety of realistic constraints, such as economic factors, safety, reliability, aesthetics, ethics, and social impact.

Personal

Personal

Societal


Personal
Societal
Professional

Ethical Issues in Design

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Ethical Issues in Design

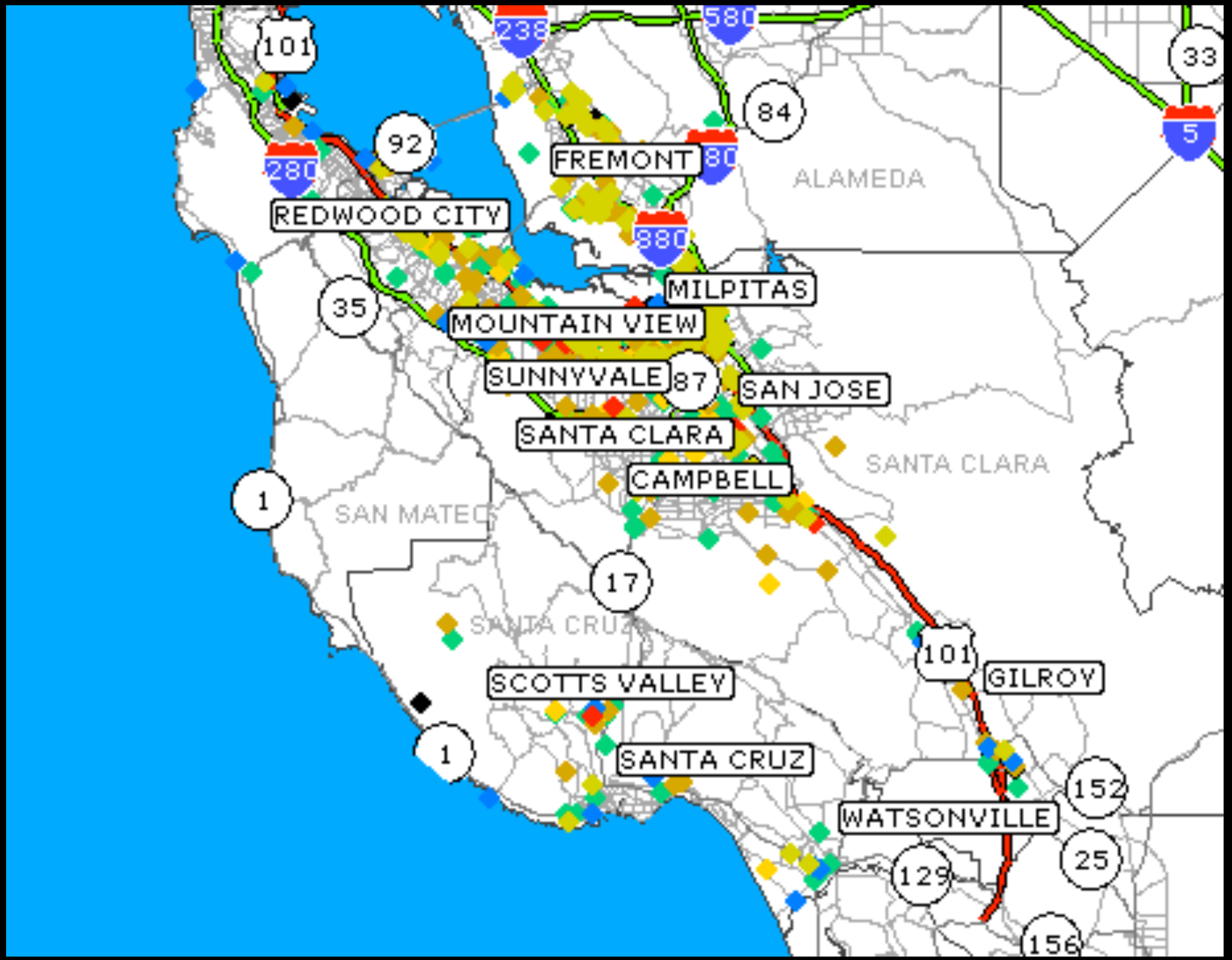
- bias: (examples, types: pre-existing, emergent, technical)
- robustness
- competence
- manufacturing
- process: communications, testing
- communications
- addressing mistakes

NAPA
SONOMA
SOLANO
MARIN
CONTRA COSTA
SAN FRANCISCO
ALAMEDA
SAN MATEO
SANTA CLARA
SANTA CRUZ

Sum of HAP Concentrations
(HAP Concentrations -- ug/m3)

- < 20.86
- 20.86 to 29.20
- 29.20 to 38.80
- 38.80 to 50.50
- > 50.50

0 10 20 30
Miles


101
238
580
33
84
92
5
280
FREMONT
80
ALAMEDA
REDWOOD CITY
880
MILPITAS
35
MOUNTAIN VIEW
SUNNYVALE
87
SAN JOSE
SANTA CLARA
SANTA CLARA
CAMPBELL
1
SAN MATEO
17
SANTA CRUZ
101
GILROY
SCOTTS VALLEY
1
SANTA CRUZ
152
WATSONVILLE
25
129
156

Engineering as Social Experiment

Roland Schinzinger & Michael Martin
Introduction to Engineering Ethics (2000)

Engineering as Social Experiment

Roland Schinzinger & Michael Martin
Introduction to Engineering Ethics (2000)

"So many products of technology present some potential dangers that engineering should be regarded as an inherently risky activity.

In order to underscore this fact and help to explore its ethical implications, we suggest that engineering should be viewed as an experimental process.

It is not, of course, an experiment conducted solely in a laboratory under controlled conditions. Rather, it is an experiment on a social scale involving human subjects."

Engineering as Social Experiment

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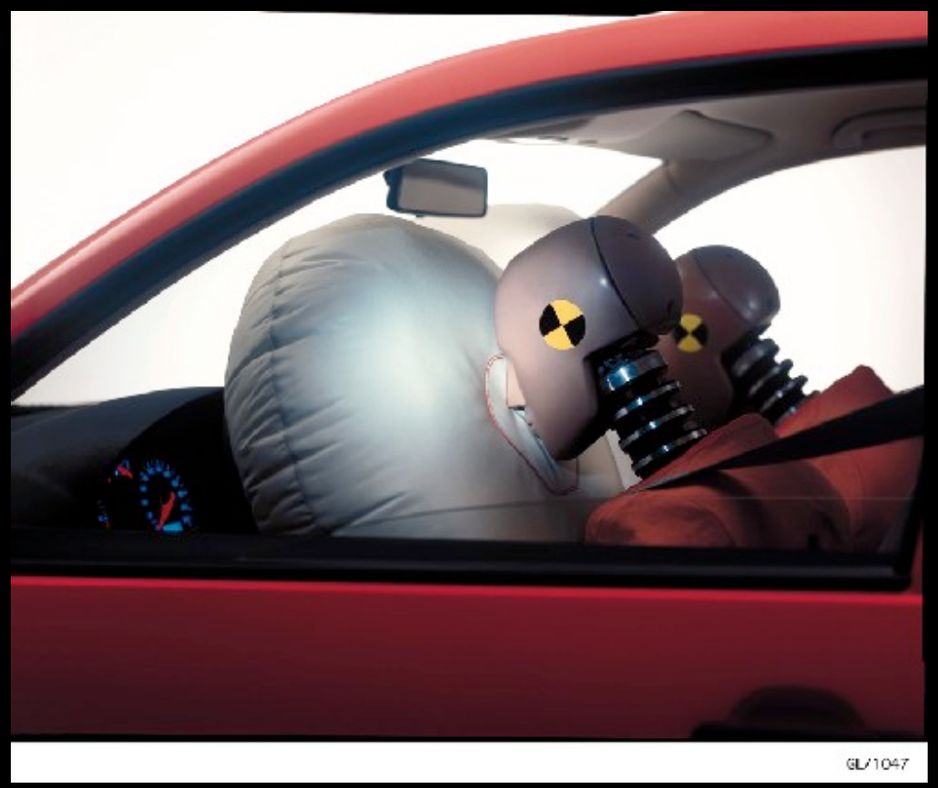
- All engineering is carried out "in partial ignorance"

- The outcomes of any project are uncertain (the law of unintended consequences)

- Monitoring is as essential in engineering as it is in experimentation in general"

Engineering as Social Experiment



The Case of Air Bag Safety

- **In 2002, motor vehicle traffic crashes were the leading cause of death for every age 3 through 33.**

- **Motor vehicle accidents were the 8th leading cause of death overall.**

- **43,005 people died in motor vehicle crashes in the United States alone.**

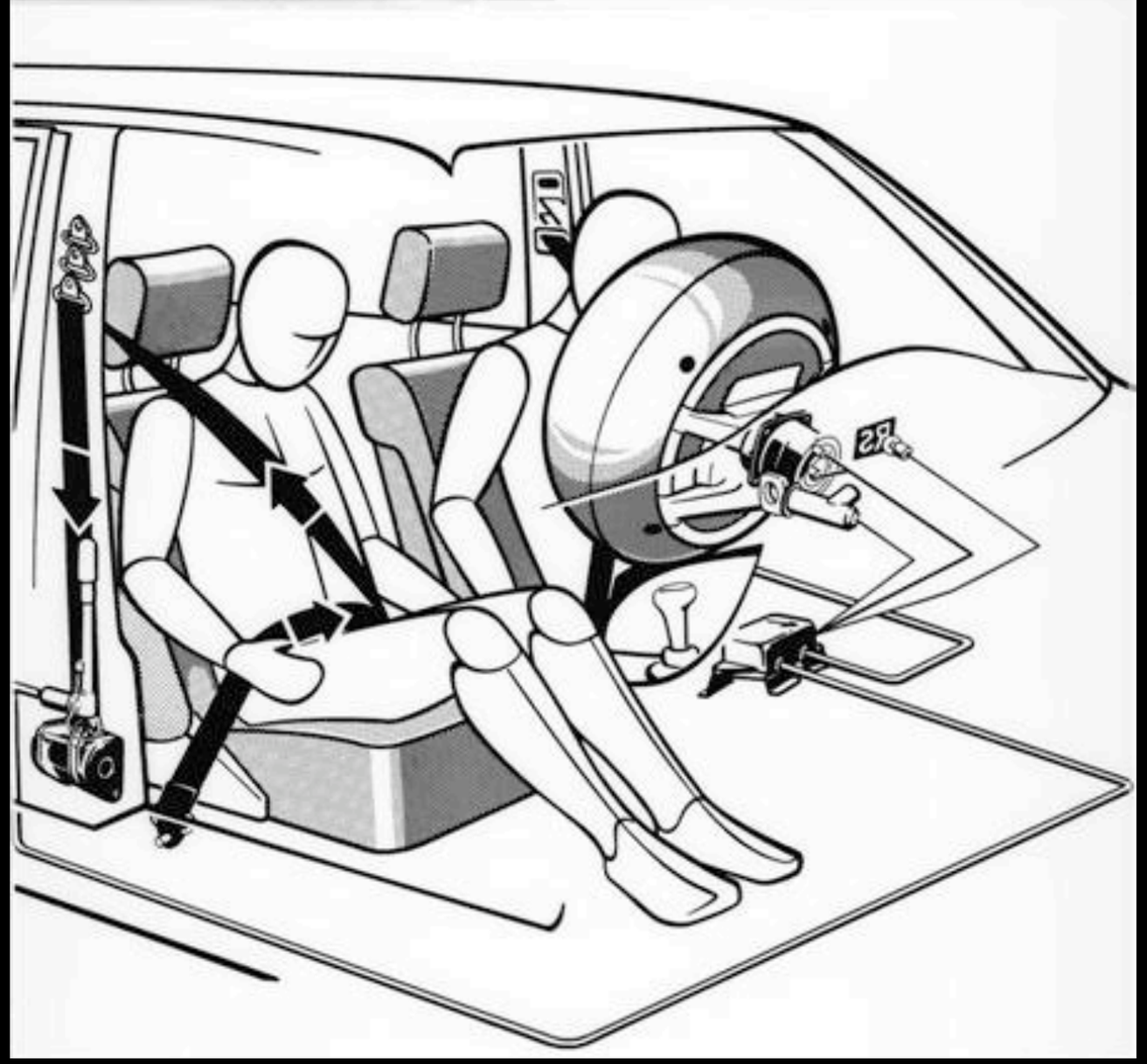
Engineering as Social Experiment

First Driver's Side Airbag, circa 1960

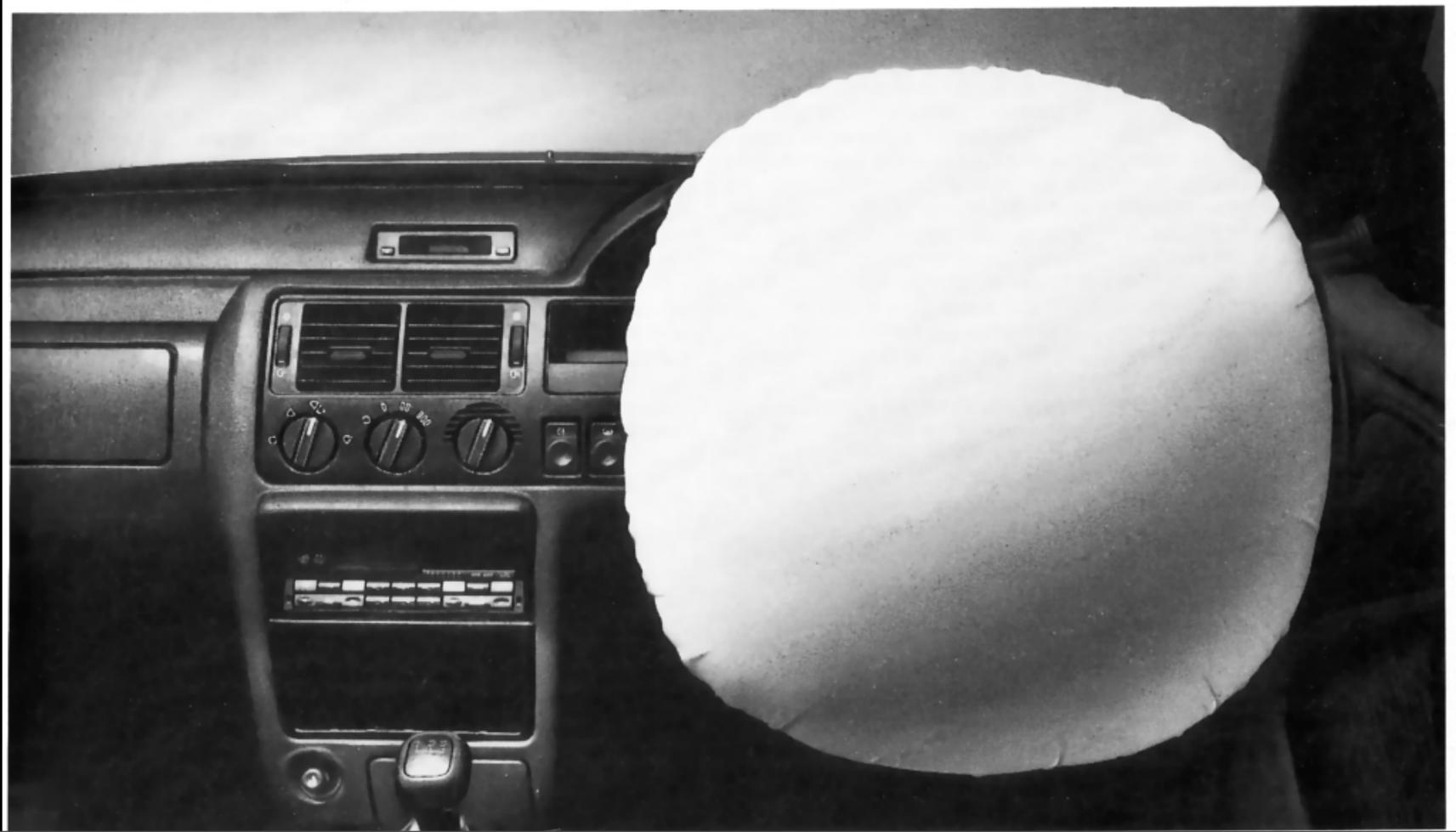
Pillow protects you in auto crashes

This "Auto-Ceptor" pillow is designed to prevent or lessen injuries in car accidents. Triggered by a crash sensor, it inflates in 1/25 second between the instrument panel and the driver and passenger. A model and dummy child demonstrate it here. It's a joint product of two companies: Eaton Yale & Towne and the Ford Motor Co.

The "Auto-Ceptor" Airbag, Popular Science 1968



Ford brings you the most significant advance in motoring safety since the seat belt...



The Challenge of Airbag Design

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Technological Uncertainty

The Challenge of Airbag Design

Technological Uncertainty

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The Challenge of Airbag Design

Social Uncertainty

The Challenge of Airbag Design

Social Uncertainty


ESCAPE


STERLING
GREETING CARDS
SODA


TOYOTA
BOLIVIA
063 YSC
084-FND

The Challenge of Airbag Design

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Addressing Uncertainty

The Challenge of Airbag Design

Addressing Uncertainty

BUCKLING UP AND GETTING INTO THE CORRECT POSITION

Wrong
Unbelted and too close

Correct
Belted and 10 inches or more away

Use Seat Belts

Move Seat Rearward

Recline Back of Seat

Tilt Wheel Down

Engineering as Social Experiment

Engineering as Social Experiment


(C) Collision Safety Institute 2004
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Moorestown lawyer joins Ford defense in air-bag lawsuit

Courier-Post Staff

CAMDEN

Pretrial hearings in a federal product-liability lawsuit over the design of air bags against Ford Motor Co. were set to intensify with the company introducing a new attorney.

Glenn Zeitz of Moorestown, who has defended many cases that have drawn nationwide interest, filed papers with the court on Thursday indicating he will join Ford's defense team.

Zeitz appeared at a routine status hearing before U.S. Magistrate Judge Joel Rosen in the

Glenn Zeitz has been involved in several high-profile cases.

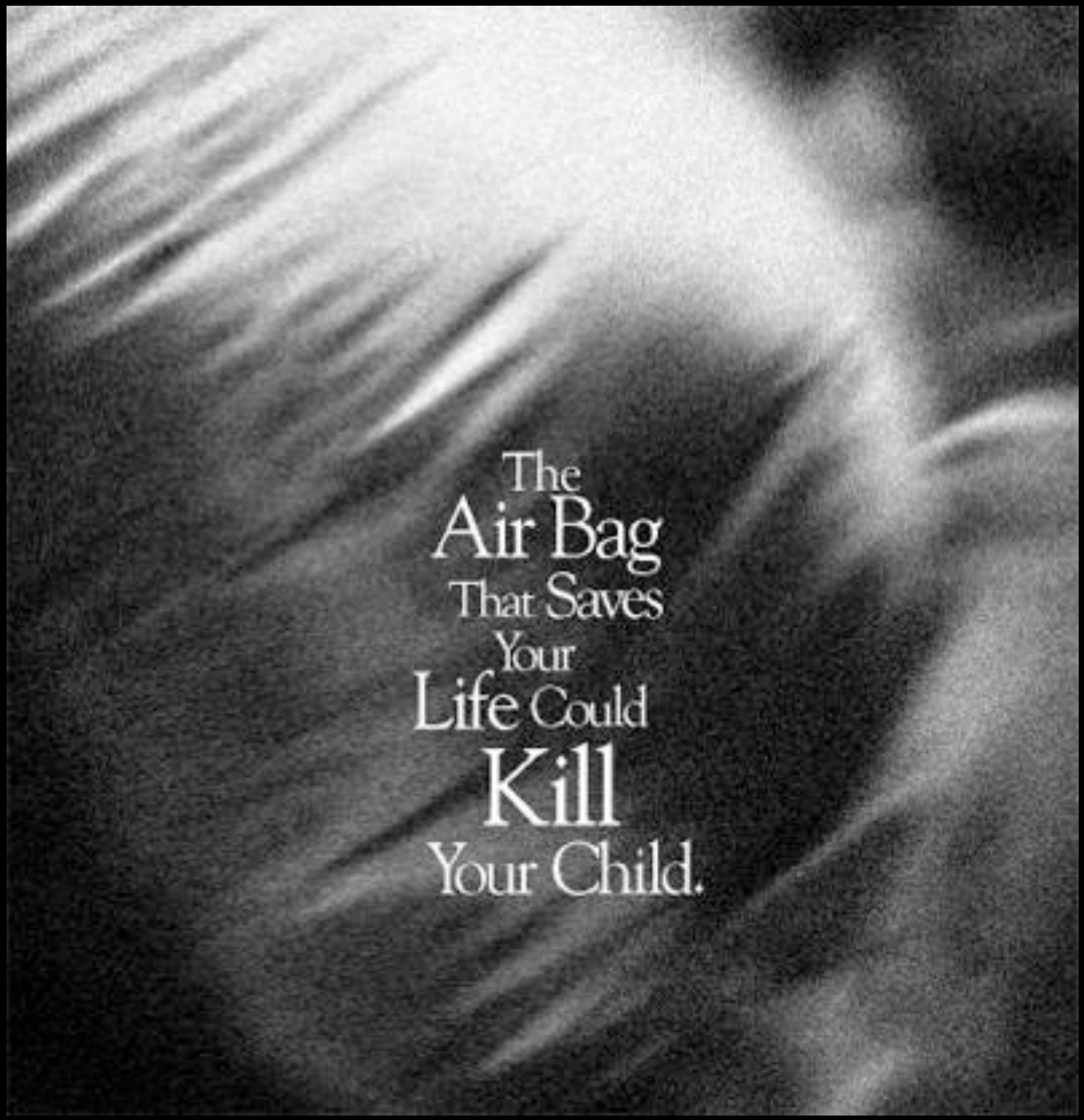
the accident.

Ford's defense now relies primarily on reports from forensic pathologists that link tiny hemorrhages in the woman's eyes to pressure on her neck attributed to manual strangulation, not damage from air bag impact.

Defense attorneys will also question Eric Thomas and his second wife, Stefanie, later this month about reports of an extramarital affair that began before the fatal accident.

Zeitz said his first assignments in the case will be to conduct depositions of polygraphists who examined Eric Thomas twice.

Engineering as Social Experiment


The
Air Bag
That Saves
Your
Life Could
Kill
Your Child.

⚠WARNING

DEATH OR SERIOUS INJURY CAN OCCUR

- CHILDREN 12 AND UNDER CAN BE KILLED BY THE AIR BAG
- THE BACK SEAT IS THE **SAFEST** PLACE FOR CHILDREN
- NEVER PUT A REAR-FACING CHILD SEAT IN THE FRONT
- SIT AS FAR BACK AS POSSIBLE FROM THE AIR BAG
- ALWAYS USE SEAT BELTS AND CHILD RESTRAINTS


NO!


NO!


NO!

Children & AIR BAGS

It's as easy as 1 - 2 - 3

1 Never put a rear-facing child seat (those used with infants) in the front seat of a car with an air bag.

2 Make sure all children are buckled up no matter where they sit. Unbuckled children can be hurt or killed by an air bag.

3 The rear seat is the safest place for children of any age to ride.

WARNING!

Check to see if your car, truck or van has front air bags...

Air bags have saved lives, but they can be very dangerous for those unbuckled – especially kids.

Buckle Up kids in a back seat away from air bags.

Turn over for critical safety points.

AIR BAG & SEAT BELT SAFETY CAMPAIGN

ALWAYS SLIDE THE SEAT BACK AND SIT BACK!

BUCKLE EVERYONE!

CHILDREN IN BACK!

Can you spot the fatal error in this picture?

The child seat is securely fitted.

The harnesses are correctly positioned.

Everything looks fine. But look again.

See that sign on the glove compartment?

Airbag.

Even in a low-speed impact, the bag could deploy and cause serious injury to the baby.

That's why you should never place a child seat up against a frontal airbag.

For a full check list of child safety tips, visit www.think.dtlr.gov.uk

Check your child seat every trip.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Demo
.MAL
JPEG
DOT 250

Report Guidelines:

Report Guidelines:

Discuss:

The larger context (technical, social, economic, legal) in which your system might someday operate.

Think about who will use this system, how, what other systems (power, support, maintenance) might be required.

Report Guidelines:

Analyze:

Provide an analysis of ethical components of the system. Discuss the potential ethical issues, risks, possible harms, etc. associated with a system.

Report Guidelines:

Recommend:

Prepare a set of recommendations for addressing possible ethical concerns.

What could be done to avoid or alleviate them?

These might include design changes, guidelines for proper use, documentation, the development of maintenance or training programs, etc.