WSP

Future Infrastructure Forum
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UNITED BY OUR DIFFERENCE

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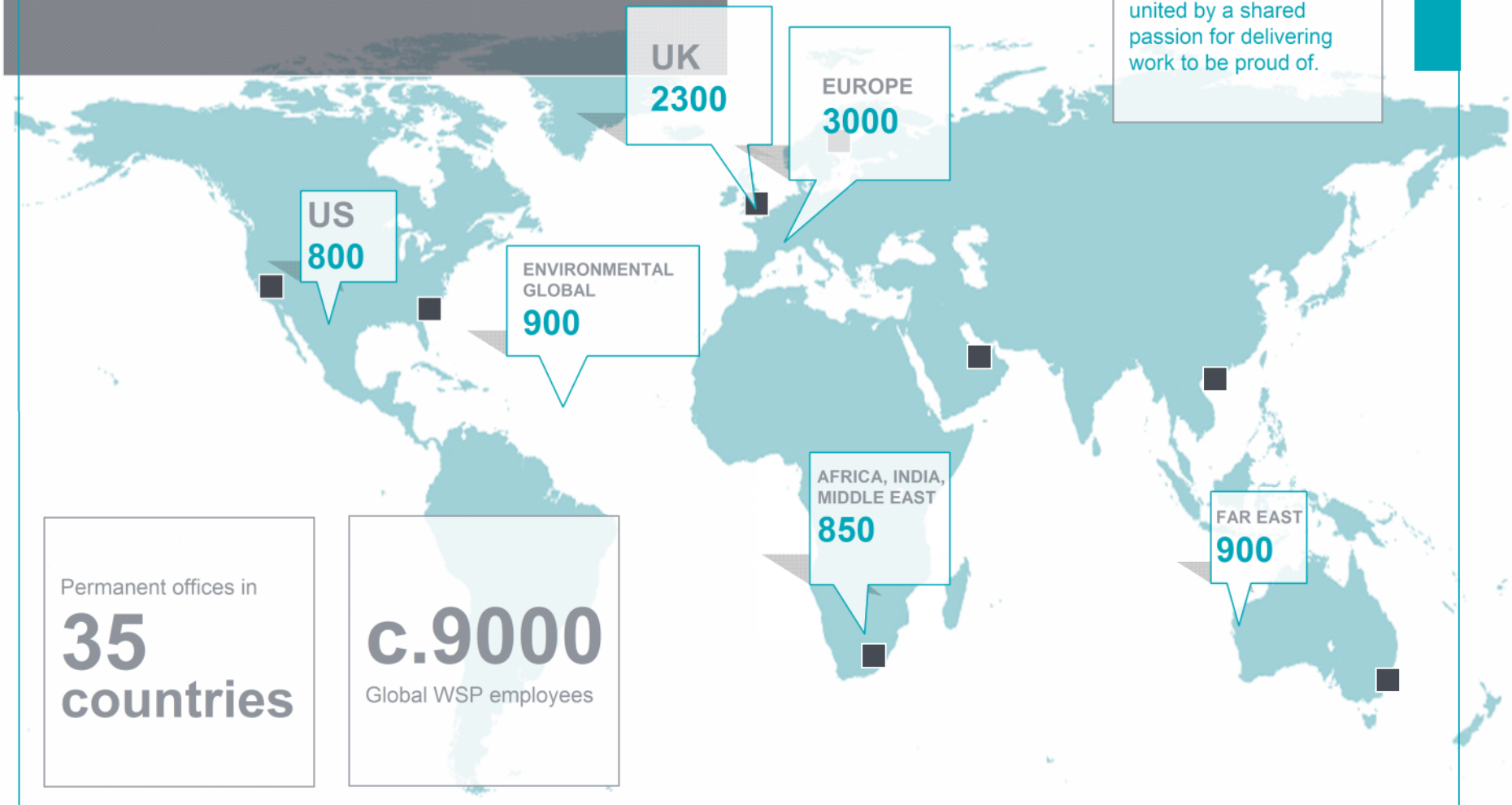
WE ARE **WSP**
GLOBAL REACH

Operating across 60 countries, we provide global expertise through local relationships, and our diverse people united by a shared passion for delivering work to be proud of.



Permanent offices in
35
countries

c.9000
Global WSP employees

OUR PROJECTS
ICONIC PROJECTS WORLDWIDE

The Shard at London Bridge

World Trade Center, New York

Zayed Museum, Abu Dhabi

OUR PROJECTS
RECENT PROJECT WINS

London Bridge Station, UK

Thu Thiem 2 Bridge, Vietnam

Mina Tunnel, Abu Dhabi

OUR PROJECTS
DRIVERS FOR TOMORROWS WORLD

Royal Seaport District, Stockholm

Transbay Transit Center, San Francisco

Solar Energy Farm, Kalahari

OUR PROJECTS
Bridges……

PROJECTS

Da Nang

USA Bridge Inspection & Maintenance

UK Bridge Maintenance/surgery

Views from the front line…….

- Buildings - Structural Engineer
- Buildings - M & E Engineer
- Bridges & Civil Engineering structures Engineer
- Own view
  - Bridge engineer
  - Involved in strategy and tactical development
  - Managing £39m of Research and technical consultancy

Buildings – Structural Engineer

Loading

- Wind speed
- Live loading - “Real" loads
- Load positioning

Building response

- Columns
- Piles
- Vibration
  - Affects comfort

Particular issue

- Piles - instrument and document for re-use.

Buildings – M&E

Most buildings are "SMART" from M&E point of view - Can be adjusted

- Consider the benefits to the users = selling point for the developer
- Already happening
- Consider the micro, macro and neighbourhood
  - The building as part of the city

Understanding of people movements

- Traffic flow
- Microsim
- Make use of existing data available (e.g. Oyster)
- “Fine tune" the building response
- e.g.
  - Building linked to transport arrivals - Programme lifts to respond
  - Finland – bus arrival link via mobile phones

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Bridges and civils -1

Whole life value?

- Whole life cost - Nice idea, difficult to justify up front costs, discount rates
- Needs a rethink.
- Whole life ENGINEERING
  - Different - see later

Asset management?

- Appropriate risk based models
- Readily used and understood
  - Assist the decision making, but don't take it

Remote monitoring for areas of concern?

- Safeguarding future serviceability
- Use of plant for monitoring where relevant
- Lessons from Finland, Se - climatic loadings

Bridges and Civils 2

Design & procurement

- Sustainability - Simplified rules to common benchmarks

Structural engineering

- Modular design
- Use/adoption of CFRP and other materials not prone to corrosion

Geotechnical engineering

- Embankments and cuttings
- Early infrastructure
  - Absence of design, variability of materials
  - Stability prediction, remote monitoring

Whole Life *Engineering*?

Consider

- “Grass field” back to “grass field”?
- Client has a stake in the project
- Public has a stake in the environment
- Designer and Contractor have a stake in safe and profitable realisation
- Some form of "audit“ at design stage?
  - Assess opportunity cost vs actual cost
- Optimize
  - Understand what client and user will value

Whole Life *Engineering -2*

Define Lifespan

- Use of structure
- Future use of structure
- Likely alterations
- Maintenance and repair
- Demolition and removal
- Residual effects

Examples

Foundations

- Instrument, test and re-use piles on congested sites
- Document in Health & Safety File – Extension of CDM??

Buildings

- Re-use of structural core
- Perimeter columns & connections allow for extensions

Bridges

- Design for widening
- Allow for increased loading

Highways

- Purchase of land for “green” lanes
- Active Traffic Management

Oil platforms

- Installation, relocation, removal, disposal

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Monitoring *vs.* Monetary????

Reality is kicking in

- Securing funds is getting tough
- Must be able to support what you are proposing with a credible business case
- Written in terms that the client can relate to, and support.

Negative angle

"If promised benefits don't happen - we'll sue....."

So what?

Must ....

- Take time to understand what stakeholders value
- Make sure proposals can be supported in these terms
- Otherwise - wasting time.

•Stakeholders?

Users of the infrastructure

- May or may not notice the improvement - quickly becomes the "norm“
- Probably not bothered so long as
  - Doesn't inconvenience
  - Doesn't offend

Clients

- Cost is ***always*** a factor
- Why should they spend the money?
  - Need to be able to express this and consider it
- Will not be interested unless “Value for Money”
  - “Value…..” - An agreed and well defined scope before starting
  - “…..for money“ - For a cost effective sum of money.
  - Stick to the plan it unless there are agreed changes – “no surprises”
- Other major drivers – Safety, public perception, ministerial imperative (etc)

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Summary – Clarity of intent

Existing infrastructure

- Concern for condition
- Rate of deterioration and residual life
- How it affects funding needs

New infrastructure

- Data gathering, use, analysis and performance
- Feedback & adjust for real time or future improvement
- How if affects funding (“needs” or “commercial return”)

“SMART” operation

- Consider context
  - Component (element)
  - Assembly (structure)
  - Neighbourhood (structure operating context)
  - Environment (global impact)
- Express as benefits that the client understands

Summary – Clarity of proposal

"FEATURES" of proposal

- Understand key drivers
  - For stakeholders
  - Especially the client
- Demonstrable benefit to client
- Saleable – in terms they can relate to *and promote*
- Manageable proposal
  - Clear objectives and scope
  - “Controlled” surprises
- Delivery and collect evidence
  - Ability to demonstrate “Value for Money”