



CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL

Del 27 al 30 de junio de 2017

Mendoza - Argentina

Winter Service in the UK from a Contractor's Perspective

Alan Chambers

www.vialidadinvernal.org.ar

ORGANIZAN



Asociación Argentina
de Carreteras





CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL
Del 27 al 30 de junio de 2017
Mendoza - Argentina

Contents

- UK Demographics and Climate – an overview
- How winter is managed – contracts
 - Clients
 - Types of roads
 - Standards and rules
 - Types of contract
- Weather forecasting and decision making
- Operational approach
- The future



CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL

Del 27 al 30 de junio de 2017

Mendoza - Argentina

UK Demographics and Climate

Split into 4 countries

- England
- Wales
- Scotland
- Northern Ireland

Population 61M unequal split

- England 51M
- Wales 3M
- Scotland 5M
- NI 2M

Population mainly in south east

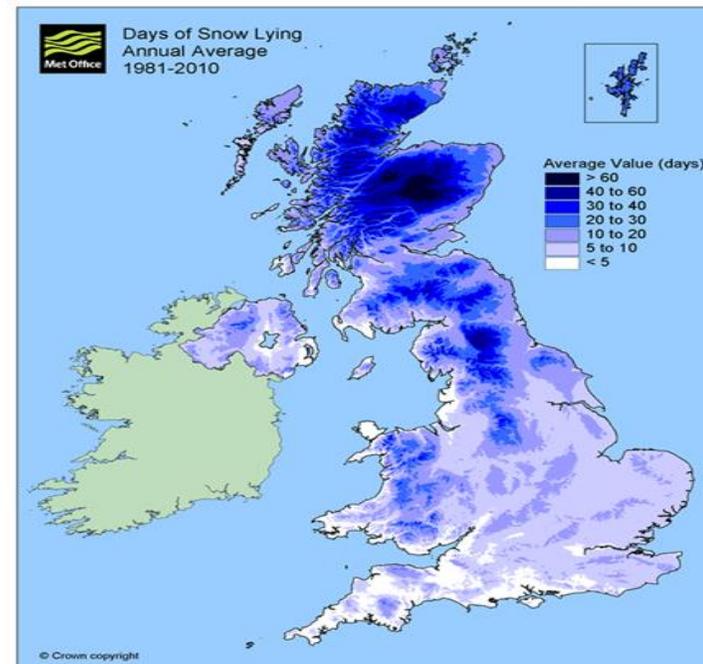


See *WRA Snow and Ice Databook 2014* – UK entry

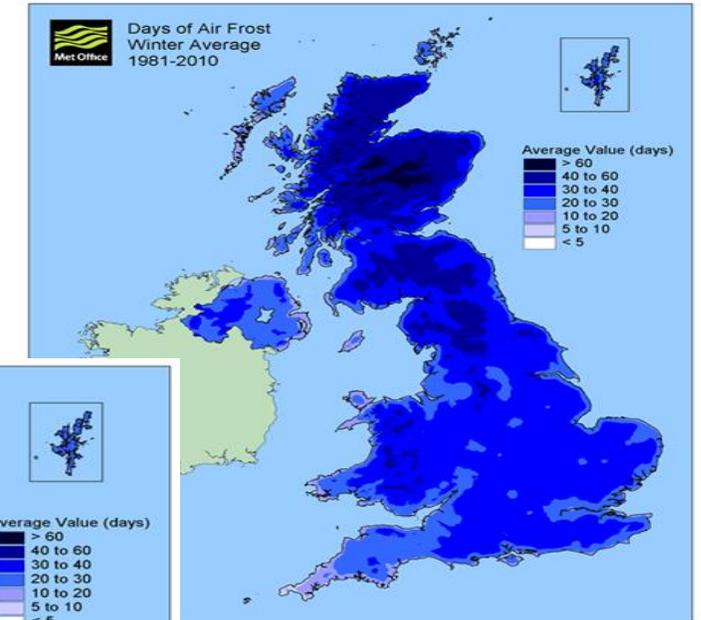


UK Demographics and Climate

- Mild climate
- Except highlands of Scotland
- Lots of marginal nights
- Mainly precautionary salting
- Some snow ploughing



Days of Snow Lying



Days of Air Frost



Clients

- Strategic Highways (Government Funded)
 - Highways England
 - Transport Scotland
 - Transport for Wales
 - Transport NI (all roads)
- Local roads
 - Counties
 - Cities
 - Metropolitan boroughs



Standards and Rules

Winter service is not just:

- Helping the network operate effectively
- Helping the economy
- A sense of duty

It is a **Statutory Duty** (under the Highways Act 1980)

to:

“...ensure, so far as is reasonably practicable, that safe passage along a highway is not endangered by snow or ice”.

Also:

“...remove obstructions of the highway resulting from “accumulation of snow or from falling down of banks on the side of the highway, or from any other cause”.

To not comply puts the highway authority at risk of legal action

Types of Contract

- Most highway maintenance privatised
- Originally based on civil engineering form of contract
- Contract length 3-10 years

Client/Managing Agent (MA)/Term Maintenance Contractor (TMC)

- Client states policy
- MA develops plan and makes decision
- TMC carries out MA's instruction

Client/Term Maintenance Contractor

- Client states policy, develops plan and makes decision
- TMC carries out client's instruction

Client/Service Provider

- Client sets policy
- Service Provider develops plan, makes decision, carries out winter actions



CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL
Del 27 al 30 de junio de 2017
Mendoza - Argentina

Design, Build, Finance and Operate (DBFO)

- DBFO company sets policy in line with contract, writes plan, makes decision and carries out winter actions.
- Contract length 15-30 years

Private Finance Initiative PFI/PPP

- Similar to DBFO
- Contract length 15-30 years

All work carried out in-house

- No services privatised

Weather Forecasting and decision making

- Forecasts by three main suppliers
- Forecasting still mainly domain based
- Road weather information systems (RWIS)
 - Standard systems now used around the World
 - Highways England now provides all information in one system
 - Decision making organization usually buys the forecast service
- Decision making
 - Set matrices for decisions and treatments
 - Highways England, Transport Scotland, Transport for Wales and Transport NI have their own – but similar
 - Local government works to national guidance document
“Well-maintained Highways – Appendix H”





Treatments

- Dry salt
 - usually 6.3mm
 - Mainly UK-mined rock salt
- Pre-wet
 - 70% salt/30% brine
 - Brine salt mainly imported - expensive
- Dry salt with Agricultural Byproduct (ABP)
 - Mainly molasses – sugar waste
- Brine Only
 - not commonly used
- Other chemicals
 - some use of potassium acetate on sensitive structures
 - Some availability of magnesium chloride for extreme cold
 - Reaction to extreme winters 2009 - 2012





Equipment Strategic Roads

- Dedicated salt spreaders
 - Reduces risk
 - Highways England provide
 - In Scotland the contractor provides
- Some snow blowers
- Some ice removal equipment (Scotland)

Local roads

- More use of demountable spreaders/ multi-use vehicles
- Mostly use main contractor's vehicles (little use of subcontractors)
- Back up from farmers and tractors in snow conditions





Staff/employees

Spreader/plough drivers

- Normally main contractor employees
- Need to be qualified – national qualification
- Problems with driver's hours regulations, 3-4 drivers per spreading route
- Reduced volumes of work
- Fewer operatives
- Subcontractors mainly as back up

Decision makers

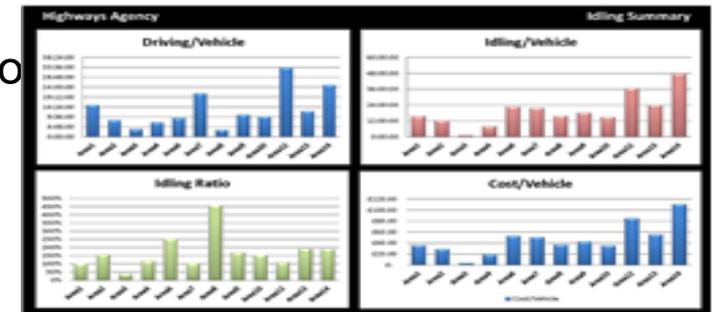
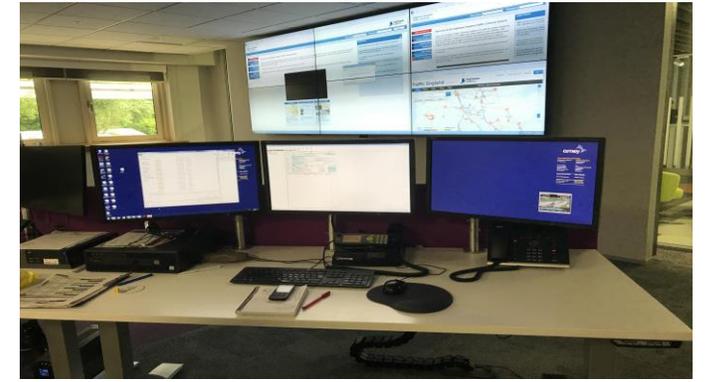
- From within contract staff
- New 4-day course to become qualified (not compulsory)





Operational control

- Use of contractor's 24-hour control rooms
- Hub for decision making and operational control
- GPS tracking common place
 - Combined with vehicle computer data
 - Records of treatments
 - Vehicle statistics
 - Driver behaviour
- GPS control slowly being adopted
- Use of public and client's CCTV and information from RWIS stations
- Vehicle mounted temperature and grip detection probes
 - Limited use
 - Feedback on actual road surface temperatures
- Focus on proving we have discharged our duty



The Future

- Maintenance Decision Support System (MDSS)
 - US developed algorithm
 - Input weather forecast
 - Output winter treatment decision
 - Little take up in UK at present
 - Models not developed enough for UK
 - High front-end investment - time and financial
 - Good for protection against legal challenge



The Future



wintersense was an EPSRC project, co-created with Amey, that adapted the HiTemp technology to measure road surface temperatures for gritting applications.

- Route-based forecasting
 - On trial and used in some areas
 - Limited success
- Wintersense
 - New cheap sensors - verification of high resolution model
 - \$150 each – developed by Birmingham University
 - Amey trials in Hampshire and Birmingham
 - Use WiFi or Internet of Things
 - Cheap, easy to install





CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL
Del 27 al 30 de junio de 2017
Mendoza - Argentina

The Future

- Brine trials
 - UK unlikely to adopt use of brine until well-proven
 - Trials between Transport Scotland/Highways England/TRL
 - Paper submitted for Winter Road Congress Gdansk 2018





CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL
Del 27 al 30 de junio de 2017
Mendoza - Argentina

The Future

New Code of Practice

- Replace Well-maintained Highways Appendix H
 - Covers all areas of winter service:
 - Planning
 - De-icer Types
 - Salt Storage
 - Treatment Methods and Technologies
 - Spreader Calibration
 - Salting Spread Rates
 - Treatments for Snow and Ice
 - Treatments for Extreme Cold
 - Treatment of Footways and Cycleways
 - Weather Forecasting and RWIS
 - Route Selection and Optimisation

The Future

New Code of Practice

- Changes to decision and treatment matrices
 - Originally based on “What has worked”
 - Now based on physics, trial results and practical experience
 - Takes into account:
 - Performance and amount of de-icer required
 - Road temperatures
 - Water film thickness
 - Moisture content of the salt (how it is stored)
 - Known losses during spreading
 - Performance/calibration of the spreader vehicle
 - Traffic and wind/vehicle side draughts
 - Living document
 - Maybe add guidance on grip factor
- Full paper submitted to Winter Road Congress Gdansk 2018



Conclusions

- Densely populated country
- Mainly temperate climate
- Winter service based mainly on precautionary salting
- Legal duty – risk of being sued
- Conservative in its approach to change
- Heavily privatised
- Always looking for a better way
- The future = Route based forecasting + MDSS + GPS controlled spreading



CONFERENCIA INTERNACIONAL
SOBRE
VIALIDAD INVERNAL

Del 27 al 30 de junio de 2017

Mendoza - Argentina

Thank you

www.vialidadinvernal.org.ar