Technical Issues

- High strength & hardness 7XXX alloys
  - generally not considered weldable
  - propensity for underbead cracking

- Current practice using 4XXX & 5XXX fillers:
  - satisfactory results achieved in most applications
  - etching response differences

- Challenges:
  - develop compatible filler alloy
  - develop weld practices to minimize cracking
Alcan Program Focus

- Develop:
  - compatible filler composition
  - welding practices to minimize cracking
GTAW Weld Samples

Single & Multipass Welds
Weld with 7XXX Filler

SEM Micrograph
Fusion Zone
Weld with 7XXX Filler

SEM Parent Metal Composition Scan
Weld with 7XXX Filler

SEM Weld Composition Scan
Weld with 7XXX Filler

Welding parameters and technique important to avoid:

• Porosity at weld start

• Solidification cracking at termination

• HAZ microcracking
Weld with 7XXX Filler: typical defect

Porosity at Start
Weld with 7XXX Filler: typical defect

Weld Termination Cracks
Weld with 7XXX Filler

Successful Repair - Course & Smooth Textures
Weld with 7XXX Filler

Course (H420) Texture Macro
Weld with 7XXX Filler

Smooth (H402) Texture Macro
Conclusions

- Alumold 500 can be successfully weld repaired with 7XXX filler
- Welding parameters and technique are important
- Texturing response is more uniform than 4XXX or 5XXX welds
- Work continues to refine the repair process