ECHELON PAVING

Glenn Highway, MP 0.0 – 1.5
Gambell Street To Airport Heights Reconstruction

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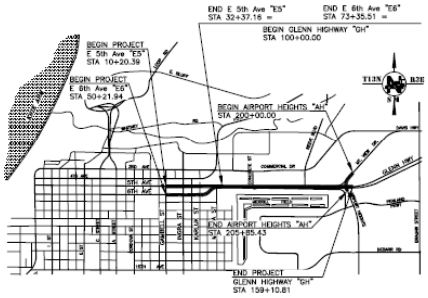
PRESENTATION TOPICS

- Project Summary
- Echelon Paving Overview
- Mainline Paving
- Advantages
- Ensuring Success
- Conclusions

PROJECT SUMMARY

- **Glenn Highway, MP 0.0 – 1.5 Gambell Street To Airport Heights**
- **General Contractor: Alaska Interstate Construction LLC**
- **Route Designations**
  - Functional Class: Urban Principal Arterial
  - 2007 A.D.T. – 43,500 2020 A.D.T. – 60,700
  - Directional Split: 70/30 Trucks (%): 6.7 %
- **Project Alignment Improvements**
  - Added one traffic lane each direction, creating six traffic lanes; eliminated bottleneck
  - Constructed four cul-de-sacs to maintain business and airfield access
  - Constructed depressed median, limiting left turn movements to signalized intersections for both mainline and side street alignments

AREA MAP



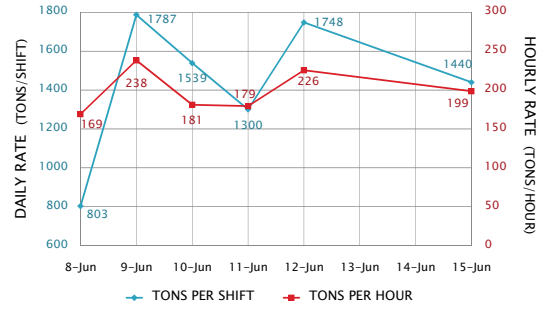
ECHELON PAVING OVERVIEW

- Echelon paving is a tandem paving configuration – one paver ahead of the other, the rear paver overlapping by 6 in.
- Hot joint paving method (150° F and above)
- Produces pavements and longitudinal joints of uniform density
- Increased production per shift
- Cross-slopes easier to maintain
- Increased demand on contractor logistics:
  - Requires a minimum of two full paving crews
  - Increase of truck numbers and plant output to match pavers
  - Trucking routes

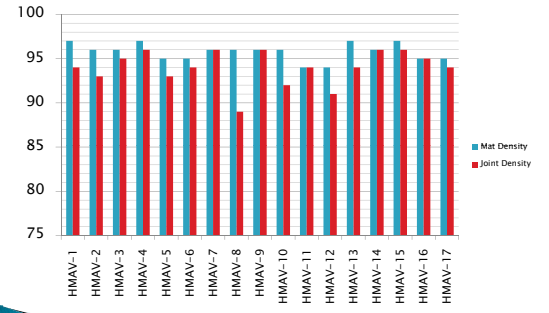
MAINLINE PAVING

- AIC project superintendent, Carl Michael, and pavement superintendent, Wayne Settje, responsible for coordinating and executing this summer's paving operation
- AIC paved in echelon 10,450 ft. of the mainline with HMA, Type V
- No change in specification of process control or acceptance
- Mainline paving took place over six days:
  - West-bound lanes: June 8th to June 10th; 21hrs. Paving
  - East-bound lanes: June 11th to June 12th, and June 15th; 22 hrs. paving
- Multiple factors contributed to decision:
  - Stringent traffic control requirements due to A.M. & P.M. commutes
    1) All west-bound lanes open by 6 A.M. daily
    2) All east-bound lanes open by 3 P.M. daily
    3) Directional closures available nightly from 8 P.M. to 6 A.M.
  - Limited nightly closure times and summer paving schedule required increased shift production
  - Elimination of mainline longitudinal cold joints, except on 5th and 6th Ave.

MAINLINE PAVING RATES

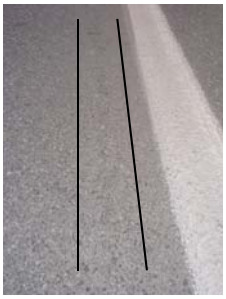


MAT AND JOINT DENSITIES (% MSG)



Hot Joint Examples

2009 – 6th Ave. & Hyder St.



1996 – Pittman Rd. Turn Lane

ADVANTAGES

ADVANTAGES

- **Hot longitudinal joints can create cost savings.**
  - For The Contractor
    - Joint preparation is a non-production item, incidental to paving
    - Eliminate personnel, equipment and time expenses associated with joint cutting, waste haul, cleaning asphalt base/regrading aggregate base, applying joint adhesive
    - Often one Crafco pot is available; Breakdowns = Shutdowns = $$ Lost
  - For The Owner
    - Pays for the asphalt waste generated from cold joint preparation
      - Echelon Paving eliminated 19,550' of longitudinal cold joints
      - Asphalt used instead of wasting – 183 tons (avg. 95.8% MSG)
      - Cost HMA Type V: $152.90/ton • Savings – $28,000
    - Long-term maintenance – Poor quality cold joints decrease the design life of roads; Joint raveling allows water infiltration into the structural section promoting further pavement failure.
    - Fewer traffic control repetitions during construction

ADVANTAGES

- Longitudinal hot joints built by the echelon paving method produce jointless pavements
- Higher quality asphalt pavements
  - Asphalt pavement panels become continuous, full-width mats
  - Excellent cross-slope control during placement
  - More uniform joint and mat densities
- Eliminates situational incentive to build lower quality cold joints
  - When cost of properly prepared longitudinal cold joint exceeds the value of the available joint bonus
  - Requirements for joint bonus met before paving completed
- Higher production rate on high priced item
- Impacts to motoring public & business along roadway minimized due to accelerated scheduling
- Shorter paving schedules enjoy more weather opportunities

ENSURING SUCCESS

- Determine whether project is a candidate for echelon paving
  - Type Of Project – Two or three lanes in both directions or new two lane, airports
  - Traffic Control
    - Alternative traffic routes – Directional closures necessary
    - Type of closure – Nightly, weekend
  - Truck Routing
    - Identify multiple project access points ahead of pavers, easiest routes only available before paving operation blocks road
    - High production operation focused on keeping pavers moving
    - Haul units need to deliver asphalt and depart with minimal conflict
    - Median barriers complicate routing, long reverse movements

ENSURING SUCCESS

- Contractor Capability
  - Crew and Equipment
    - Reliable equipment is a given
    - Experienced employees determine the success of the operation
    - At least two full paving crews are necessary with a full compliment of equipment
    - Upon job completion: What is the status of the extra personnel? How are they to keep busy?
  - Batch Plant Capacity – Plant production needs to be able to provide a reliable, continuous stream of asphalt to pavers
- Use pre-paving meetings as a tool to explain and refine paving plans. Everyone there wants a successful project upon completion.
- For nightly closures, set a hard time limit when paving stops, cooling and striping still need to occur to avoid penalties.

Conclusions

- Echelon paving produces a superior pavement product; the hot longitudinal joint and uniformly dense pavement mat are characteristics of durable, long lasting roads.
- There are practical limitations on where echelon paving can be used, but if it is a viable alternative, it should be the method of choice.
- The goal is to keep moving. There is no substitute for experienced personnel and reliable equipment in preventing hiccups in paving continuity.
- Airport projects could have this paving method written into their standard specifications as a means to limit cold longitudinal joints.
- Using warm mix asphalt technologies may allow more projects as candidates to pave in echelon. The goal is to promote hot longitudinal joints as a means of extending pavement life.
- Enough stress cannot be placed upon implementing hot longitudinal joint paving methods to limit the number cold joints. Government agencies and contractors need to work together and promote opportunities to prevent this: