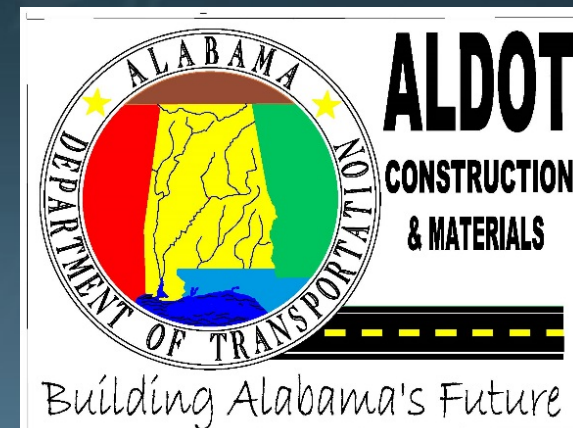


Common Plan Errors: Construction Perspective

Skip Powe, P.E.

State Construction Engineer

Alabama Department of Transportation



What do these
have in
common?



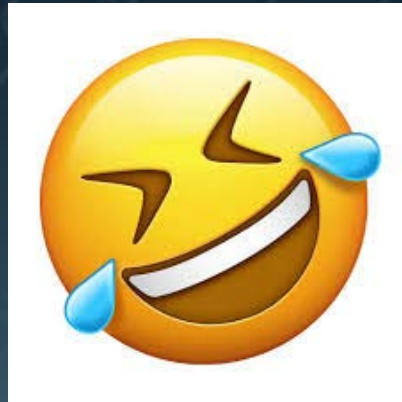
Scoreboard: W 1, A 0, P: 9

TONIGHT'S UMPIRES	
SKIP POWE	HP
SACHA SANGUINETTI	1B
MOE MOGE	2B
LALO MENDOZA	3B
CHARLES MCELROY	LF
ANTHONY PRATER	RF

A photograph of an umpire wearing a black cap, a black jersey with a patch, and a protective mask.

What do these have in common?

- What a construction guy feels like
- Talking to designers about their errors



- But somebody has to wear the black hat

Overview



- Disclaimer
- Flashbacks to 2016-2018 Precon
- GDCP
- Common Plan Errors
- Letting Changes
- Impacts
- How do we improve

Disclaimer



This is to discuss:

- Common plan errors
- Impacts to projects/funding

Disclaimer

This is **NOT** to specify:

- Project/County
- Bureau/Region/Area
- Consultant

I am not (intentionally) calling you out!

2016 Precon Conference

Design Errors/Omissions Found in Field

- H. O. C.
- 7 types of design reviews
- 958 design change orders in 15 years
- Examples
- Cost/Time impacts

2017 Precon Conference

Common Plan Errors: CN Perspective

- Box Sheets \neq SOQ
- Using Inactive/Obsolete Pay Items
- Quantity calculations/errors
- Not using Material & Foundation Reports
- MSE Retaining Walls
- Aggregate Foundations

2018 Precon Conference

Common Plan Errors: CN Perspective

- GDCP Step 95 - Construction
- Top 10 List

1. Pecking Order
2. Project Notes
3. Standard Dwgs
4. Material Recommendations
5. Rushed plans
6. Earthwork
7. Pavement Preservation
8. RAP
9. TCP
10. Trooper vs Uniform Police Officers

GDCP

Guide for Developing Construction Plans

- Revised March 19, 2018
- Greg Wells presentation yesterday
- Step 95 – Construction

GDCP

Step 95 – What do we do?

- Final check – materials, typicals, PNotes, SOC, bridge, ESC, etc.
- Try to do constructability
- Assign Special Provisions
- Determine Contract Time
- Calculate DBE Goal

GDCP

- Unfinished and incomplete plans difficult to review
- Missing extra copies for Bridge, Environmental, DBE
 - Affect our ability to review and provide timely comments
- Bad estimates affect DBE goals
- Understand letting deadlines
 - Late submittals for Final Construction Review
 - Affect our ability to schedule and prioritize reviews

GDCP

- Should not comprise plan quality because designer misses deadline
- Hurts us in field as you will see
- If trend continues, our only choices are:
 - Shift to next letting
 - Return plans to designer until they are ready for review

GDCP

- What if you have special project?
 - Due to design features or need unique special provisions
- 3 weeks is limited to review and address unique provisions
- If project is “HOT”, priority, have-to-let, etc.
 - Region/Area needs to communicate at PS&E time
- Allows us a head-start to help you make the letting

GDCP

- JRC's comments yesterday:
 - Hates processes and procedures
 - But wants plans on-time, on-budget
 - AND... NO SCOPE CREEP
- Puts pressure on Regions:
 - Set realistic letting dates
 - Manage plan development and review processes
 - Hence, need the GDCP or we get rushed plans and overruns

Common Plan Errors

Top 10 List

1. Project Notes
2. Material Recommendations
3. Soft soils, Borrow, UW Embankment
4. Patching
5. Leveling
6. Guardrail
7. Striping
8. Temporary Sheet Piling & Soldier Pile Walls
9. Aggregate Surfacing to fill median for IM Widening
10. Barrier Rail on IM Widening

Common Plan Errors

Project Notes

- Repeat Specs
- Trash Specs
- Means & Methods on how to do the work
 - Micro-mill speed, vacuum trucks in non-mill/fill
- Shifting ALDOT duties to the Contractor
- *Use PNotes to clarify or to add restrictions*

Common Plan Errors

Material Recommendations (*Repeat 2017 & 2018*)

- Materials Report
- Slope Study
- Foundation Report
- *Key investigations not making it to or not agreeing with plans*

Common Plan Errors

Material Recommendations (*Repeat 2017 & 2018*)

- Undercutting unsuitable soil
- Culvert foundations
- Special project notes

What is point if left out of plans?

Common Plan Errors

Top 10 List

1. Project Notes
2. Material Recommendations
3. Soft soils, Borrow, UW Embankment
4. Patching
5. Leveling
6. Guardrail
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10. Barrier Rail on IM Widening

Letting Changes



GFO 3-5 Plan Revisions

- Instructions on flagged sheets
- Applies to both:
 - Prior-to-letting
 - Post letting

Letting Changes

- Number of changes after advertising is rising
- Many of them in last week
- Unfairly stretches OE
- Significantly affects bid
- When changes happen late with many sheets
 - bidders guess and guess HIGH!

Letting Changes

<u>Year:</u>	<u>Changes</u>	<u>Jobs pulled</u>	<u>Lettings</u>
• 2015:	146	17	12
• 2016:	142	16	13
• 2017:	172	26	11
• 2018:	<u>194</u>	12	12
• 2019:	82	4	4, so far

Letting Changes

<u>Year:</u>	<u>Changes</u>	<u>Avg</u>	<u>Pulled</u>	<u>Avg</u>
• 2015:	146	12	17	1.4
• 2016:	142	11	16	1.2
• 2017:	172	16	26	2.4
• 2018:	194	16	<u>12</u>	<u>1.0</u>
• 2019:	82	<u>21</u>	4	1.0

Note: on track for 267 changes in 2019

Letting Changes

- Dangerous trend
- Increasing changes indicative of plans **NOT** ready to let
 - Either reviews not thoroughly done
 - Hurried to meet letting schedule
 - **Both???**
- Results are higher bids

Impacts

For errors not caught before letting, what happens?

- (a) H. O. C.
- (b) Change Orders
- (c) Delays and Time Extensions
- (d) Overruns
- (e) Impact to the Traveling Public
- (f) All of the above***

Impacts

Change Orders 2010 - 2017:

- 2081 Change Orders totaling \$94.1 Million
- 297 per year for \$13.4 million avg
- 3361 days of Time Extensions
- Equates to extra 19 years of Work Zone

Impacts

Change Orders 2018:

- 346 totaling \$16.7 Million
- Increase over 2010 – 2017 (avg)
- 297 per year at \$13.4 million

Time Extensions 2018:

- 1211 days
- Equates to extra 6.7 years of Work Zone

Impacts

Major Overruns / Changes

≥ \$100,000 per GFO 4-3

<u>Period</u>	<u>#</u>	<u>Total Costs</u>	<u>Avg.</u>
April '16 – Mar '17	17	\$9.6 million	\$561,000
April '17 – Mar '18	41	\$13.3 million	\$323,000
April '18 – Mar '19	58	\$14.6 million	\$251,000
	+241%	+52.0%	-55.3%

Impacts

- Spent approximately **\$31 Million** in change orders and major overruns in 2018
- Was \$26 Million in 2017
- What about regular overruns?

Impacts

Pay Item Overruns by % (from CAMMS)

Projects	382	399	410
• <u>%</u>	<u>2017 (pages/items)</u>	<u>2018</u>	<u>2019</u>
• $\geq 15\%$	403 \approx 9600	367 \approx 9200	345 \approx 8600
• $\geq 50\%$	253 \approx 6000	229 \approx 5700	217 \approx 5400
• $\geq 100\%$	173 \approx 4000	154 \approx 3850	142 \approx 3100
• $\geq 500\%$	42 \approx 1000	36 \approx 900	32 = 470
• ≥ 1000	20 \approx 500	25 \approx 450	18 = 149

Impacts

Overruns' Disclaimer

- Don't cost a higher unit price
- Items already bid
- But, do prolong project life
- Affect budgets
- Which delays other project lettings

Impacts – Trends

- Plan Changes during Letting: +22
- Pulled projects from Letting: -14
- Change Orders: +49
- CO Money: +\$3.3 Million
- Construction Time: +6.7 years
- Pay Item Overruns:



Impacts



Seen some minor improvement (overruns),

But still a lot of H. O. C.

Makes planning projects difficult

How do we improve?



How do we improve?

- Field Investigations of Site Conditions
- GDCP
 - Use it; plan and manage your work
 - Follow the steps and review processes
- Plan Reviews
 - DO THEM!!!
 - Don't go through the motions!

Plan Reviews

At Region Level

- Plan-in-Hand
- PS&E
- Supplemental PS&E
- Of course, internal checks

At Central Office

- Quality Control
- Construction
- Office Engineer

Give them their proper focus

How do we improve?

Feedback

- Design Error/Omission change orders (starts with us)
- Major Change Orders per GFO 4-3 (new report for RE)
- Pay Item by % (CAMMS)
- Post Construction Reviews

Post Construction Review Update

- Discussed at last 3 Pre-cons
- FHWA Peer Exchange with Kentucky
- Learned from their process
- 2 Reviews on I-59 in Tuscaloosa
- 5 Reviews on various jobs in Mobile Area

Post Construction Review Update

- Will use lessons learned to determine next steps
- Policy/GFO to define our process
- Which Bureau is the right one to coordinate???

If Designers don't know the field problems, how will they change and adjust plans???

In Closing



- Still struggling with variety of issues
- Need to focus on GDCP
- Emphasize deadlines and plan work to meet them
- Plan Reviews have a purpose
- Bad trend on changes for letting

In Closing



- Plan errors cost/impact:
 1. Time
 2. Money
 3. More H.O.C.
- Future:
 - Performance measures
 - Better forms of feedback
 - Post construction reviews

Work Zone Safety Awareness Week

Orange ribbon is in memory of those who have died in work zones



Questions???

STAY ALERT

IN WORK ZONES

Jacob Smith
1980 - 2016
Brake for Jake

UNIVERSITY OF ALABAMA
STRUCK-BY ALLIANCE
DRIVE SAFE ALABAMA
DEPARTMENT OF TRANSPORTATION