



Highway Construction and Maintenance Cost Control Ideas

May 2010

Maintenance (Pavements)

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>1. Limit Use of ACP overlays to repave or resurface roadways less than 10,000 ADT.</p>	<p>Cost savings would be difference between ACP placement costs and cost of a seal coat.</p>	<p>Surface Treatments should be used in lieu of ACP on pavements with ADT <10,000 provided the existing pavement has no significant issues with structural capacity, rutting, ride quality or noise mitigation; urban areas, intersections and roadways with greater than 10% truck traffic may also be exceptions. Type D or F mix should be considered to restore sections of roadways with ADT <10,000. CST is developing guidance for the selection of ACP mixture types.</p>	<p>Type F mix with RAP and/or RAS may be cost competitive (with seal coat) if placed in the ¾” to 1” thickness range. The material cost for Type F mix placed 1” thick with 15% RAP & 5% RAS would be just over \$2.10/SY. (Not an in-place price.)</p>
<p>2. Limit seal coats on shoulders 4’ and greater to every other seal coat cycle.</p>	<p>We currently maintain 446,898,768 SY of flexible pavement shoulders. Cost savings potential could be as high as \$50,000,000 a year.</p>	<p>Directive issued on 02/26/2010 which limits seal coats on shoulders 4’ and greater to every other seal coat cycle, unless otherwise approved by the District Engineer.</p>	
<p>3. Use spot levelup with seals.</p>	<p>Assuming 10% of the lane miles overlaid were low volume, savings could be as high as \$22,000,000 a year.</p>	<p>While patching is still a component of the full PMIS, reports are run without patching to determine efforts to stretch dollars and address pavement conditions. Districts are encouraged to use strip and spot seals and levelups as needed.</p>	<p>Districts stated they have implemented or will implement. Patching is still included in PMIS distress and condition total scores but reports can be run without the patching utility to evaluate how districts are stretching dollars.</p>
<p>4. Increase use of drag boxes (rut fill boxes) in level-up operations to eliminate wheel ruts.</p>	<p>Use of rut fill boxes reduces the amount of HMA used for level up in the elimination of ruts.</p>	<p>Use of rut fill boxes should be a best practice in Districts.</p>	<p>Rut fill boxes may be ordered from Camp Hubbard.</p>



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<p>5. Spot and strip seal main lanes and shoulders.</p>	<p>In FY 2006, we seal coated 22,217 LM where 781 LM of that was spot and strip. Assuming that if you use spot and strip seal (30 percent of the lane width) for 10 percent of the roads that you would normally seal full width, the potential savings could be as high as \$17,500,000 a year.</p>		<p>Most districts stated this is a current practice and may expand its use. Considerations are made for differential skid.</p>
<p>6. Engineer the seal coat. Select the appropriate asphalt aggregate and precoat requirements. Consider reduced requirements for underseals and shoulders.</p> <p>a. Select the appropriate asphalt grade for the application and for competition.</p> <p>b. Select aggregate for underseal understanding need for grade and SAC.</p> <p>c. Select appropriate material for precoat or whether to precoat. Precoat may be needed for hot applied asphalt but not needed for Emulsions.</p>	<p><i>See following spreadsheet showing cost per SY for different asphalts and seals.</i></p> <p>Aggregate manufacturers state that allowing emulsion precoating can save up to \$6 a CY of aggregate.</p> <p>Higher binder grades are generally not necessary for underseals.</p> <p>Surface Classification does not apply to underseals.</p> <p>Grade 5 aggregates have been shown to be effective aggregates for seal coats on shoulders and on lower volume roadways with smooth surfaces.</p>	<p>Table of seal coat alternatives has been developed to give guidance about binder/aggregate selection based on traffic level. Guidance includes lower cost binders for underseals and precoating. Also allows Item 318 seals to be bid vs. Item 316.</p> <p>Memo from Toribio Garza dated 02-25-2010 implements policy requiring use of alternate materials in all seal coat/surface treatment applications.</p>	<p>Districts have had input on the table of alternates. Memo dated 02-25-2010 implements this as policy. It also addresses payment for all seal coat work by volume rather than by weight, seal coat construction seasons and scheduling and timely completion of work.</p>

Typical Materials and Costs (2007)
Item 316 Cost per Square Yard

Aggregate	Binder					
	AC-20-5TR	AC-15P	AC-20XP	CHFRS-2P	CRS-2P	AC-10
P 3S SAC-B	\$1.94	\$1.84	\$1.83	\$2.23	\$2.17	\$1.76
3S SAC-B	\$1.77	\$1.68	\$1.67	\$2.07	\$2.00	\$1.59
3 SAC-A	\$1.57	\$1.47	\$1.47	\$1.72	\$1.67	\$1.41
3 SAC-B	\$1.50	\$1.41	\$1.40	\$1.65	\$1.60	\$1.35
4 SAC-A	\$1.47	\$1.37	\$1.36	\$1.55	\$1.51	\$1.32
4 SAC-B	\$1.14	\$1.04	\$1.04	\$1.22	\$1.19	\$0.99
5 SAC-B	\$0.89	\$0.80	\$0.79	\$0.89	\$0.87	\$0.76

Assumptions:

1. Same road conditions.
2. Emulsion allows 10% reduction in percent residue.
3. AC-20-5TR requires a slightly higher application rate.
4. Yellow highlight shows for precoat versus non-precoat for Grade 3S case.
5. Not shown here is that when binders are bid with alternates, the prices are generally lower.



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<p>7. Use rut boxes and scratch microsurface passes to address rutting in the wheel path.</p>	<p>In FY 2006, we overlaid 6,304 lane miles. Assuming that we micro 10 percent of the lane miles normally overlaid and 30 percent of the lane is in wheel paths, the potential savings is \$12,000,00 a year.</p>	<p>Recommended practice for districts.</p> <p>Use the most cost effective treatment.</p>	<p>Most districts stated they have implemented or will implement. Some concern over long term performance of microsurface, as microsurface is not a good candidate for distressed pavements. Two districts stated they address rutting with thin ACP as it can be more cost effective to use thin ACP.</p>
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Pavement Design and Alternates for Pavement Design

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<p>8. Consider alternative designs.</p> <p>a. Ultra Thin Bonded Wearing Course (Novachip) versus an underseal with PFC, all with lane rental.</p> <p>b. Hot in Place Recycling (HIR) with virgin material overlay in same pass (Cutler) versus Dustrol followed by an overlay versus mill and overlay with 30 percent RAP, all with lane rental.</p> <p>c. Thin Bonded PFC versus an underseal with PFC, all with lane rental.</p> <p>d. Concrete pavement versus flexible pavement.</p> <p>e. Look at alternative pavement designs such as lime, lime-fly ash, cement, ASB, emulsion stabilizations and combinations thereof.</p>	<p>Refer to Thomas R. Bohuslav's memorandum of December 2, 2004.</p> <p>a. Districts noted from contractor comments that even though the UTBWC was low when applying lane rental, prices for both dropped.</p> <p>b. Creates competition for the one pass (Cutler) process.</p> <p>c. Creates competition.</p> <p>d. Bell County project included concrete pavement alternate. Low bid was \$81 M. Projected savings of concrete pavement over flexible was \$11 to \$16 M without applying discounts for future overlays.</p> <p>e. Will increase competition. Alternative structurally equivalent pavement designs were generated (FPS-19W) using virgin materials for a moderate level of traffic (assumed traffic was 5,000,000 ESAL's). Relative costs per lane mile to construct (disregarding mobilization). Does not consider maintenance cost. What is shown below is an example of cost analysis for alternative pavement designs:</p>	<p>a. Research was proposed at RMC1 to look at ultrathin overlays, but was not funded. Districts are directed to evaluate programs for potential efficiencies and provide alternate pavement designs which are competitive in nature.</p> <p>b. New specifications for HIR have been developed that establish greater performance reliability.</p> <p>d. The policy for alternate bidding of pavement types (for new construction or full reconstruction) was issued by Mr. Casteel on November 19, 2009, and can be found at ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/cost_control/altpavdes_111909_casteel.pdf</p> <p>e. Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Most districts stated they have implemented and consider on a case by case basis.</p>



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<p>f. Recycling pavement versus virgin design to restore surfaces.</p> <p>g. Use Base Selection Guide to select correct base grade for application. Set up alternate base grades when the base selection guide allows alternates.</p>	<p><i>HMA-Cmt Stab Base-Lime Treated Subgrade: \$356,800. Relative cost = 1.00</i></p> <p><i>HMA-Lime Stab Base-Lime Treated Subgrade: \$518,200. Relative cost = 1.45</i></p> <p><i>HMA-Lime-FA Stab Base-Lime Treated Subgrade: \$505,000. Relative cost = 1.42</i></p> <p><i>HMA-ASB-Lime Treated Subgrade: \$411,100. Relative cost = 1.15</i></p> <p><i>HMA-ASB-Flex Base-Lime Treated Subgrade: \$423,400. Relative cost = 1.19</i></p> <p>f. For an existing highway requiring rehabilitation using full-depth rehabilitation (pulverizing existing structure, cement treating reclaimed surface/base to 12-in, resurfacing with HMA), relative cost per lane mile to reconstruct is: HMA-Cmt Stab Base-no Subgrade Treatment: \$ 281,500. Relative cost = 0.79</p> <p>For an existing deep HMA structure requiring rehabilitation by milling 4" of mix and resurfacing with a structural HMA overlay: HMA-existing HMA-no subgrade treatment: \$304,600. Relative cost = 0.85.</p> <p>g. Provides for proper materials selection without over specification. Provides for completion. Specific costs are not available currently, but may be added as they become available.</p>	<p>f. Additional guidance and specifications have been developed that require and encourage the use of RAP.</p> <p>g. Base Selection Guide can be found at ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/cost_control/flex_base_selection.pdf The Special Provision can be found at ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/specs/2004/prov/sp247033.pdf</p>	<p>Most districts stated they have implemented and consider on a case by case basis.</p>
<p>9. Provide appropriate pavement designs for detours.</p>	<p>Properly designed detours should save contractors maintenance expenditures and provide motorists with a safer and more reliable facility during construction.</p>	<p>Guidelines have been developed. If these guidelines are approved by the Administration, they will be posted in the Design Manual.</p>	



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<p>10. Consider flex base with 2 course surface treatment (CST) as an option to flex base with ACP.</p>	<p>Traffic Assumptions: ADT 1500, 20-year 2300 - Growth rate of ~2.2%. Cumulative 20 year ESAL's is 1.1 M</p> <p><i>Strong subgrade (West Texas shallow bedrock) cost/lane mile</i> 2" HMA-8" flex base: \$197,120 2 CST-12" flex base: \$171,380 relative cost ratio: 0.87</p> <p><i>Weak subgrade (East Texas, deep bedrock)</i> 2" HMA-12" flex base + 6.0" lime treated subgrade: \$280,880 2 CST 15" base + 6.0" lime treated subgrade \$243,400 relative cost ratio: 0.87</p> <p>The assumption above for the weak subgrade scenario also assumes a Grade 1 Type A flex base. If more typical locally available flex base were used the figures for the weak subgrade region would change as follows: 4" HMA-12" flex base + 6.0" lime treated subgrade: \$384,130 2 CST 18" base + 6.0" lime treated subgrade \$278,600 relative cost ratio: 0.73</p>	<p>Districts should strongly consider flexible base with 2 CST design for rural facilities with less than 2000 ADT. Considerations above 2000 ADT are encouraged.</p>	<p>Current procedures with FPS use a modulus of 250ksi and thickness of 0.5 inches for a 2-Course ST. Use of other model inputs may require research to validate projected performance. Districts stated they will consider. Some statements that they will consider for detour, rural, low volume roadways. Specific guidelines and matrices, including traffic volumes, were presented by two districts for implementation.</p>
<p>11. Expand the use of full depth reclamation for rehabilitation of roadways.</p>	<p>Cost savings should be realized by not having to remove and haul off existing materials and then replacing with new materials. This process would also be less disruptive to motorists and expedites time required for rehabilitation.</p>	<p>Recommended for low volume two-lane roadways. A cost effective solution for highly deteriorated pavements, it requires detailed pavement evaluation to develop an appropriate pavement design.</p>	<p>Research project 0-6271, "FDR (Full-Depth Reclamation) Performance Based Design, Construction and Quality Control", began October, 2008 and will end 08/31/2010. The goal of this project is to develop comprehensive guidelines and specifications for full-depth reclamation. Propose implementing new specification requirements as needed.</p>



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<p>12. Rehabilitate some higher volume roadways under traffic, utilizing ACP courses and surface treatments instead of constructing detours and rehabilitating roads in phases.</p>	<p>Cost savings should result from elimination of detours. Rehabilitation process may also be expedited.</p>	<p>Detailed pavement analysis is necessary to ensure proper pavement design. An ACP level-up course would normally be required since desirable ride characteristics would be difficult to obtain under traffic.</p>	
<p>13. Use alternate bid items to increase competition through the bid process.</p>	<p>Plans with alternate bid items provides options to contractors which increases competition.</p>	<p>Bid item alternates should be provided in plans whenever possible. Items which are similar in function and quality should have multiple materials or processes set up in the plans to allow the contractor the ability to provide the lowest bid.</p>	<p>This is not to be confused with Alternate Pavement Designs (rigid and flexible pavements). Process or material alternates should provide near equivalent end results. Alternates for bid items can be competitive in the bid item description or as an alternate bid.</p>



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<p>14. Use RAP and crushed or broken concrete in construction. Give contractors the option of using salvaged materials.</p> <p>a. Blend up to 50% RAP with virgin materials for driveways, crossovers, other miscellaneous areas, shoulders, for underlying layers, and for bond breaker for rejuvenated RAP and RAP blended in ACP.</p> <p>b. Use RAP in base.</p> <p>c. Allow for the use of crushed concrete in flexible base.</p> <p>d. Allow the use of crushed concrete recycled as an aggregate in new concrete.</p> <p>e. Allow use of crushed concrete recycled and placed in embankment.</p> <p>f. Allow use of broken concrete when rock/rubble riprap is specified.</p>	<p>a. Blended with virgin material can save up to \$6 per ton of mix. For shoulders, \$15 a CY rejuvenated RAP versus \$60 per ton for virgin ACP.</p> <p>b. The best use of RAP to yield true cost savings is to recycle it into new ACP.</p> <p>c. Varies depending on the availability and market of the material in an area. For a large urban district, this could save as much as \$1.5M per year.</p> <p>d. No additional savings.</p> <p>e. No additional savings.</p> <p>f. Allowed by current specifications. No additional savings.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p> <p>b. Research Project 0-6084 “Cement Treated RAP”, began Oct. 2008 and is scheduled to end 08/31/2010. This project will develop a mix design procedure, construction guidelines and specification requirements.</p> <p>c. Directive concerning crushed concrete in flexible base was issued 02/26/2010, requiring Type D Flexible Base (which is Type A and crushed concrete) to be used in lieu of Type A Flexible Base. Guidance is provided in the directive. This is allowed by current specifications for non-structural concrete under Item 421.2.E.1 (Coarse Aggregate”).</p> <p>e. This allowed by current specifications as 132.3.B “Rock Embankments”.</p> <p>f. Existing Specification Item 432.2.C.3. “Common” allows broken concrete “when shown on the plans or approved”. Specification wording needs to be changed to “is allowed unless otherwise restricted by the plans”.</p>	<p>Districts stated they have implemented or will implement. Some discussion on application location, experiences, and strategies for use. One district uses 100% CSB RAP under concrete pavement and has had success. Comments that it is best to use these recycled materials on the original project where it was generated.</p> <p>d. Item 421 allows crushed concrete to be used as a coarse aggregate for pavements and non-structural concrete. This is not a special class which requires a plan note. It is already an option for the concrete supplier. More information can be found at ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/tech/rca_barton.pdf</p> <p>f. Item 432.2.C. 3. “Common” allows the use of broken concrete for this particular type of riprap. “Common” stone riprap is the most used type and we do allow broken concrete “when shown on the plans or approved”. Broken concrete should not be allowed for Type R and F and decorative, oriented riprap. Broken concrete should not be allowed for “Protection” type stone riprap used in our most critical applications as this typically requires large individual stone sizes. Allowing broken concrete for the “common” stone rippaps grants usage on most jobs.</p>



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15. Increase availability of state-owned RAP to contractors for use in ACP.	Use of state-owned RAP should decrease contractor material costs and result in lower bid prices.	Special Provision 341---024 allows the contractor to use their own RAP or TxDOT owned RAP if available. Casteel memo dated 11-02-2009 requires existing RAP stockpiles to be depleted. If a project does not generate sufficient RAP to be re-used, notes should be included in plans which designate locations of existing RAP stockpiles available to the contractor.	
16. Give contractors the option of retaining salvageable RAP and concrete materials.	Salvaged materials retained by the contractor should create efficiencies which would ultimately increase competition and result in lower bid prices.	Directive dated 02/26/2010 requires plans to designate RAP and salvageable concrete materials to be retained by the contractor.	
17. Allowance of RAP and RAS in ACP.		This has been addressed in a memo from Mr. Casteel and in a required Special Provision for Item 341.	A memo was sent to DE's from Mr. Casteel dated 11-02-2009 regarding special provisions for fractionated RAP. This memo directed districts to refrain from using plan notes that preclude or restrict the use of RAP. Special Provision to item 341 permits the use of RAP, RAS and WMA unless otherwise shown on the plans. Special Provisions with similar wording will be available for other HMA items by Summer 2010.
18. Allow contractor the option of placing warm mix or hot mix on projects in non- and near non-attainment areas as well as on projects in more rural areas of the state.		A national research project to be completed in 2011 will generate more accurate emission data. At that time we may be able to better quantify emission reductions from WMA as compared to HMA. TxDOT will share preliminary emissions data with MPO's for them to consider what	AGC advises they have been looking at the economics and believe the cost of warm mix could be higher than hot mix in some situations. AGC and TxDOT agree that the option of warm mix should remain. As an additional development, not part of a cost saving implementation,



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		<p>state implementation plan (SIP) credits, if any, should be considered. SP 341-024 allows contractors options to save money or reduce their emissions. SP 341-024 is required for all projects beginning December 2009. It allows RAP and RAS use unless otherwise specified, allows substitute binders if performance tests are met, allows WMA unless otherwise shown on the plans and requires WMA if shown on the plans. Similar specifications for other mix types are under development.</p>	<p>TxDOT is developing a briefing document entitled "Reducing Green House Gas Emissions in Asphalt paving". This document outlines how the use of technologies which use RAP, RAS and WMA can result in reductions of CO2. The Director of CST, Russel Lenz, has also requested a white paper on carbon and SIP credit options for sustainable pavements.</p>
<p>19. A list of alternate ACP's should be developed.</p>		<p>CST has developed a chart of ACP alternates. These guidelines have been reviewed and modified based on comments received from CST and District personnel. If the ACP alternates guidelines are approved by Administration, a policy directing utilization should be issued.</p>	
<p>20. Use Type C ACP with a PFC as a cost effective option to SMA. Prohibit use of SMA mixtures on roadways with less than 20 million ESAL's.</p>	<p>More options and proper use of SMA mixtures should increase competition and decrease costs.</p>	<p>Guidance for the use of SMA's is included in the ACP alternates guidelines developed by CST. (See above.)</p>	<p>CST only recommends SMA for high volume highways, such as Interstate & US highways, with a minimum of 5 million ESAL's.</p>
<p>21. Engineer ride and schedule application. Know existing ride for overlays.</p>		<p>Recommended practice for districts.</p>	<p>Districts stated they are doing this. Guidance provided at ftp://ftp.dot.state.tx.us/pub/txdot-info/des/specs/ridequal.pdf Districts are adding to their PS&E Checklist.</p>



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<p>22. Apply 60 and 70 degree pavement temperature restrictions for ACP placement using good judgment.</p>		<p>Not necessary when using special provision 341-024 as it allows lower pavement temperatures. Similar wording will be included in special provisions for all other hot mix items.</p> <p>Districts should educate their inspectors on district practices for applying the specification and consider all factors identified in the Construction Technical Quarterly. Districts should develop general notes necessary for applying the requirement in their district.</p>	<p>Districts have implemented. Districts stated they have developed general notes using the Technical Advisory, ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/tech/ta081706.pdf made a topic on the pre-paving meeting, and instructed their inspectors on appropriate actions.</p>
<p>23. The type of Material Transfer Device (MTD) to be the option of the contractor. Specific Material Transfer Devices (MTD's) or Material Transfer Vehicles (MTV's) should not be required.</p>		<p>It is recommended that the following language be included in plans as a general note for Item 320:</p> <p>“Provide a material transfer device capable of providing a continuous flow of material to the paver. The material transfer device will consist of a windrow elevator or better.” As an alternative, a special provision may be developed to void and replace Item 320.2.C.2 Material Transfer Devices.</p>	
<p>24. Limit the placement of underseals for ACP mixes with low permeability.</p>	<p>The cost of the underseal would be eliminated resulting in overall savings. Savings potential could be \$1.50 to \$2.00 per SY.</p>	<p>A Directive dated 02/26/2010 eliminates underseals of low permeable ACP mixes or seals on top of thick subsurface mix sections of 6” or greater unless approved by the District Engineer.</p>	



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<p>25. Consider alternatives to 4 inch ACP as bond breaker under concrete pavement. Rigid Pavement Design allows 3 possible layer combinations (bond breaker and non-erodable material) which could be bid as alternatives</p> <ul style="list-style-type: none"> a. 4 in. of ACP b. 4 in. of ASB c. 1 in. ASB over 6 in. of CSB 	Creates competition. There is a research project to address other alternatives.	Recommended practice for districts. Changes to existing design alternatives will be based on the current implementation project. (Research Project 0-6037)	There is ongoing research to look at additional options. An implementation project funded under the HfL program (Research Project 0-6037-Alternatives to Asphalt Concrete Pavement Subbase for Concrete Pavement) is ongoing in FTW to assess the performance of additional bond breakers currently not allowed in the Pavement Design Guide.

Alternative Materials, Material Allowances, and Requirements

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26. Salvageable MBGF elements should be retained by TxDOT and reused in Maintenance MBGF Repair/Replacement Contracts or on other projects as applicable.	Assuming districts do not reuse any (some do) and assuming that approximately 30 percent of it is reusable the potential savings could be \$2,000,000 a year.	Directive dated 02/26/2010 requires salvaged guard rail elements to be re-used on current or future projects.	Districts stated they have implemented in maintenance and construction. MNT and districts state this is used for rail repair work.
27. Reduce the MBGF concrete mow strip thickness from 5" to 4".	The material cost of concrete for the mow strips would be reduced by 20%.	Directive dated 02/26/2010 limits the max. thickness of mow strips to 4".	Each District has MBGF mow strip standards which will need to be revised.
28. SGT on off-system bridges.	TxDOT replaced 151 off-system bridges last FY. SGT's averaged \$1,997 and turn downs averaged \$371. This would have been a net savings of \$1,000,000 statewide.	There has been no change in the FHWA position with respect to the use of crash tested systems on off-system bridges.	
29. Off-system bridge approaches should match existing roadway surfaces.	If seal coat or ACP surfacing is not required, cost savings result from not requiring contractors to move in specialized equipment and crews to perform very small amount of work.	Directive dated 02/26/2010 requires design and construction of approaches to off-system bridges which are similar to existing pavements. The design and construction is to be cost effective yet adequate for projected traffic	



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		<p>loads. Use of stabilized materials and oil sands is encouraged. Approach slabs should be considered where heavy truck traffic is present.</p>	
<p>30. Reconsider requirements for certification for concrete plants and trucks, including structural concrete.</p>	<p>This cost is \$1000-\$2000 for plants and \$1000 to \$7000 for trucks per year. Added cost would be due to a plant or truck requiring repair in order to pass the inspection. New special provision 421-024 now allows the Engineer to waive the certification requirement for non-structural concrete and non-bridge class culverts.</p>	<p>Current special provision is optional to districts for non-structural and non-bridge class culvert concrete. Districts may submit to the Specification Committee a special provision for structural concrete plant inspection by the department, beyond the 421-042.</p>	<p>Some districts will consider waiver and department inspection, on a case by case or district basis. Some districts state plants in their area are currently certified and they do not plan on waiving the requirement. One district stated that they plan to inspect the plants before the lettings to make them aware of what is needed in order to supply materials (waiver and department inspection).</p>
<p>31. Proper requirements for PG binder.</p> <p>a. Reduce use of restrictive specification requirements.</p> <p>b. Specify higher grade PG binder only when needed.</p>	<p>a. Item 341 Type-C SAC-A, PG 76-22 vs. PG 76-22S: 12 mo. Moving avg. \$68.45 vs \$72.54/ton - \$4/ton diff. Item 341 Type-C SAC-B, PG 70-22 vs. PG 70-22S: 12 mo. Moving avg. 63.91 vs 74.99/ton - \$11/ton diff. Item 341 Type-C SAC-B, PG 76-22 vs. PG 76-22S: 12 mo. Moving avg. 68.22 vs 80.14/ton - \$12/ton diff.</p> <p>b. PG 70-22 is polymer modified where PG 64-22 is not. Item 340 Type A w/ PG70-22 = \$85/ton versus w/ PG 64-22 = \$72/ton -- \$13/ton diff.</p>	<p>This issue has been addressed in Special Provision 341-024 which allows substitute binders. Similar wording will be implemented for all other hot mix items. We need to develop a state-wide optional blanket field change that would allow substitute binder on existing projects. We could split the savings with the contractor and save \$1.50 to \$3 per ton.</p> <p>See John Barton memorandum of June 13 and June 26, 2008.</p>	<p>Districts stated they have implemented or will implement. Some districts stated they do not specify modifiers. Guidance for PG binder selection at: ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/PGSelectionProcess.pdf Mixture selection guide ftp://ftp.dot.state.tx.us/pub/txdot-info/des/specs/fixpave.pdf</p>



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<p>32. Provide for alternative materials and construction methods in PS&E. For certain materials, haul limits the competition severely and the more options you can give, the better prices we can get from a contractor.</p> <p>a. Provide AEP, PCE, EAP&T as an option to MC-30</p> <p>b. Use emulsions as alternatives for prime coat. (Item 310 versus Item 314 and CSS-1 and SS-1.)</p> <p>c. Alternative binders for seal coat.</p> <p>d. Concrete pipe and plastic pipe alternates.</p>	<p>a. AEP example 12mo. Moving avg. Item 310 MC-30=\$2.86 and AEP=\$1.92; PCE= \$1.5/gal. Application rates are approximately the same as MC-30. This provides options, especially when the materials are not readily available.</p> <p>b. For Item 314 (alternate to 310) MS – 2 OR AEP is \$2.25. For the same residual, will require higher application rate for the emulsion but creates options for bidders that will increase competition for the MC-30 product.</p> <p>c. For most applications, alternatives can be bid against each other to create more competition.</p> <p>d. Creates competition.</p>	<p>Recommended practice for districts.</p> <p>d. See Barton emails of January 4, 2010, on thermoplastic pipe.</p>	<p>Districts stated they have implemented or will implement some aspect of this recommendation.</p>
<p>33. Allow poly-fiber reinforced concrete riprap as an option in non-structural concrete.</p>	<p>Using fibers as opposed to wire mesh should save construction time and potentially decrease the material cost which in turn should save TxDOT money without sacrificing (possibly even enhancing) the concrete quality.</p>	<p>TxDOT is currently in the process of developing a material producer list that will allow concrete fibers in lieu of wire mesh in concrete applications such as sidewalks, curb/gutter, riprap, and mow strips</p>	<p>Material producer list is expected to be completed by March 2010.</p>
<p>34. Allow for Class 5 or Class 8 for concrete joint seal. Used for joint sealer for concrete pavement or bridge joint sealant.</p>	<p>Allowing Class 5 or 8 increases the number of material sources and results in more competition. That for similar size projects specifying Class 8 cost \$1.63/lf and Class 5 cost \$2.25/lf.</p>	<p>For bridge joints subject to movements, the only sealant that works well is a Class 7 sealant. The Class 5 and 8 sealants may work for pavements where movements are very low.</p>	<p>The Class 7 sealant cures more quickly than the Class 5 and 8 sealants and can handle traffic or joint movement in the same day. Class 5 and 8 sealants will tear apart overnight as the joint moves.</p>



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Structures and Structure Aesthetics

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>35. Aesthetics Bridges</p> <p>a. Example of steel traps versus I-beams.</p> <p>b. Minimize wall panel unique designs.</p> <p>c. Ask locals to participate in the aesthetic cost.</p> <p>d. Standardize design and repetition. In regard to repetition, address competition.</p> <p>e. Address consultant designs not in agreement with TxDOT standards or practice.</p> <p>f. Reduce painted concrete.</p>	<p>a. Could have saved \$1 M on one project and traps would have required fracture critical BRINSAP inspections.</p> <p>b. Unique wall panels designs can cost up to \$6000 per panel and non-standard copings require new formwork adding as much as \$50 per linear foot.</p> <p>c. Increased costs associated with aesthetic treatments can be avoided.</p> <p>f. While initial cost is low, around \$0.25 per SF, maintenance costs are high. Hartman bridge initial paint was \$20,000 and a repaint has been let for \$800,000, requires removal of existing paint and total cost is \$3 to \$5 per SF.</p>	<p>Districts are directed to evaluate programs for potential efficiencies. This is not to detract from required programs such as the Green Ribbon Program.</p> <p>b. Minimize unique panels designs, raised pilasters and corners, customized form liners, and non-standard copings on retaining walls. Use of such designs and treatments should not be allowed unless paid for by a third party.</p> <p>c. Aesthetic treatments should not be funded by TxDOT. Any aesthetics included in plans should be paid for by a third party. Exceptions should require approval of District Engineer or higher.</p> <p>e. Addressed elsewhere in this spreadsheet.</p> <p>f. It is recommended that painting of all concrete structures be limited to that which is necessary as an after-the-fact ASR mitigation option. Unless paid for by a third party, surface finishes for concrete which minimize initial construction costs and also have minimal long term maintenance costs should be specified.</p>	<p>b. BRG monitors projects that are under development for unusual/excessive aesthetic requirements. Districts state they manage added cost for aesthetics, including asking for local participation. Examples presented on the Green Ribbon program to standardize aesthetics.</p> <p>d. Districts stated they will take advantage of repetition and will make contractors aware of where they plan to use special forms for future projects.</p> <p>f. Strategies for using dyed concrete may reduce maintenance cost. Silane and opaque sealer application may be our most effective after-the-fact ASR mitigation option. There may thus be sound economic reasons for “paint” to enhance concrete durability.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>36. Bridge Rail a. The use of slip formed all-concrete rail should be maximized.</p> <p>b. Prohibit the use of T and C-411 rail unless paid for by a 3rd party.</p>	<p>a. Slip formed concrete rail offers advantages over concrete rail requiring a lot of form work. Economical advantages diminish on projects with small rail quantities.</p> <p>b. Average state-wide bid prices for T-411 and C-411 rail are currently \$96 and \$94 per LF respectively. In comparison, T-501 rail is \$40 per LF and T-203 is \$55 per LF.</p>	<p>a. On projects with large concrete rail quantities, provide options for slip formed rail.</p> <p>b. Directive dated 02/26/2010 prohibits specification of T and C-411 rail unless paid for by a 3rd party or otherwise approved by the District Engineer.</p>	
<p>37. Design foundations to the appropriate depth.</p>	<p>Several cases where foundations have been designed to a depth exceeding requirements. One case where there was 144 feet of excessive drilled shaft at an extra cost of \$24,768.</p> <p>There have also been cases where a design penetrates well beyond the 3 (surface) and 1 (at depth) diameter into rock. One case of 80 feet of excessive penetration at an extra cost of \$22,000.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Districts stated they agree and have no problems. Suggestion that consultant plans should be reviewed by qualified geotechnical design staff.</p>
<p>38. A piling vs. drilled shaft alternate should be provided for bridges where practical.</p>	<p>When allowed on the plans, piling can often be a more cost effective option over drilled shafts.</p>	<p>Drilled shaft and piling alternates should be provided for all bridge foundation designs where practical. Reference Chapter 5 of the on-line Geotechnical Manual for additional information regarding selection of foundation types. Expertise and guidance is also available at the BRG Division.</p>	
<p>39. Prohibit use of integral colored concrete.</p>	<p>Use of integral concrete colorants increases the costs where specified.</p>	<p>Directive dated 02/26/2010 prohibits use of integral concrete colorants unless paid for by a third party or otherwise approved by the District Engineer in writing.</p>	<p>AGC advises that is difficult to obtain bid quotes for such concrete.</p>



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Roadside Maintenance and Landscaping

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>40. Reduce intensive landscape that requires high maintenance, hand mowing, and bed maintenance. Execute agreements with locals to perform maintenance. Let landscape along a corridor.</p>	<p>TxDOT spends approximately \$5M/year for landscape maintenance, increasing approximately \$500,000 per year. If no additional intensive landscape maintenance were installed or if agreements were made with cities, counties or associations (Garden clubs, etc) to maintain those areas, potential savings would be \$500,000/yr.</p>	<p>Recommended practice for districts. Districts should coordinate work so that only necessary landscaping is included in the plans and further consider letting landscape along corridors after construction is complete.</p>	<p>Districts stated they have been or plan to ask locals to participate in landscape, including maintenance. Some statements that the locals criticize the district in that they refer to other areas of the state where higher intensity landscape has been provided. One district stated they plan on requiring the locals fund 50% of the landscape initial cost and that the locals be responsible for maintenance. District stated that Inmate labor is being used or use is being considered. Districts stated they use plants that are low maintenance and have low water needs.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>41. Incorporate native and adapted plants in roadside re-vegetation and landscaping whenever possible.</p>	<p>Use of native and adapted plants reduces mowing and other related maintenance expenditures.</p>	<p>Directive dated 02/26/2010 requires the use of native and adapted plants in roadside re-vegetation and landscaping. Native and adapted plants can be as effective as a non-native mix in establishing cover.</p>	<p>Research has proven that this mix will establish an area quicker than a pure native or non-native mix, providing a long term sustainable right of way. Studies also have shown that decreased mowing frequency can be favorable for the establishment and maintenance of native plant populations on roadsides (and detrimental to the establishment and spread of some invasive species). Plus, this mixture fits in well with the surrounding natural landscape. Using native and adapted plants in roadside landscaping can be aesthetically appealing, ecological, and cost-effective. For more information, see the 2009 Research Results Report at ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/gov/annual_report_2009.pdf</p>
<p>42. Utilize compost in the most appropriate areas.</p>	<p>Compost costs range from \$3,000 to \$12,000 per acre. Reduce the areas receiving compost to only areas of limited and poor topsoil. Currently, TxDOT spends approximately \$10 million per year on compost. This number can be reduced by 60-70% by utilizing only where necessary.</p>	<p>Districts should emphasize salvaging and protecting topsoil and only utilize compost in areas of little or poor topsoil.</p>	
<p>43. Old Jersey-type barrier should become property of the contractor on current or new jobs.</p>	<p>Salvaged barrier can be crushed or otherwise broken up to be recycled into new concrete, incorporated into flex-base or used as riprap, thereby lowering the cost of these materials.</p>	<p>Current policy allows the use of Jersey Barrier in a temporary capacity on projects. What is in excess of future needs or barrier which is damaged should be shown in the plans to be retained by the contractor.</p>	



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>44. Set a 30' maximum mowing width off of the outside pavement edge on rural highways.</p>		<p>Directive dated 02/26/2010 sets a 30' max. mowing width on rural roadways.</p>	<p>Special situations (minor remaining distance to ROW or adjacent property and brush control needs) may warrant a wider "clean up" mow the last cycle of the year.</p>
<p>45. Mowing start dates need to be more flexible. Do in a way that encourages competition.</p>	<p>From analyzing some comparable districts that are flexible with start work dates to districts that require all contractors to start on the same date, a cost savings of \$4.78 per acre was observed. There are only 2 districts that require all contractors to start on the same day. These districts could save a total of about \$550,000 per year by staggering starting dates.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Districts stated they have implemented this or a similar program and will evaluate further. Districts stated that they are already flexible by coordinating with their contractors and maintenance offices and manage best to address safety and wildflowers. Some state they do not see elevated prices due to time requirements.</p>
<p>46. Maintenance related. Mowing when not needed. Mowing 8 inch grass to 4 inches.</p>	<p>In FY 2006, we mowed 1,779,595 acres at \$26.80 per AC. Assuming that 10 percent of those acres did not need mowing, we could have potentially saved \$4,769,315.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Districts state they only mow when needed. Districts states they have or plan to set up less cycles and add cycles if they need it after letting or make use of spot mowing or add optional cycles to be used for wet years.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>47. Increase use of prison labor. Contract with prisons to clean, repaint, service equipment, etc.</p>	<p>The Lubbock District spent an average of \$17,000 for oil change and car wash services during the last two fiscal years. Since the Lubbock District has one of the largest fleets, the average district expense will be less than that. If the average district expense is estimated at \$12,000 per year, and 50% of the districts were able to utilize prison facilities for these services, we could potentially save \$150,000 per year.</p>	<p>Districts are to work with MNT to execute agreements with TDJC for prison labor. (Not all prisons have access to the facilities and equipment necessary to perform all these tasks. Even when a location has a prison which is capable and equipped to perform the work, it is not always reliable, from a time standpoint, due to prison requirements, lock downs, etc. TDCJ needs to have a standard approach to these agreements across the state. The use of prison labor could affect State use contracts in various parts of the state.)</p>	<p>MNT states prison labor can be used for maintenance of equipment including cleaning of salt and sand cleanup. MNT is working on new contracts for prison labor. Several districts stated they use prison labor with some and limited success. Works is focused on labor intensive type work. Some comments that the department competes with locals in that the cities and counties who provide lunches and transportation for inmates. Some comments on coordinating with TIBH. Comments on the lack of interest by wardens. Some statements that the participation has diminished due to restrictions from the prisons (suggesting need for top level commitments from TDCJ).</p>

Markings

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>48. Develop recommendations to modify RRPM standard to increase spacing from 10' to 20' on 8" white lane lines.</p>	<p>Savings would be half of the current cost to install RRPM, which is approximately \$740 per mile.</p>	<p>PM(4)-10 revised spacing requirement for TYI-C and TY II-C-R pavement markers on 8" solid line to 20'.</p>	
<p>49. Develop recommendations to reduce the number of: a. Turn arrows in left and right turn lanes. b. Arrows in Two Way Left Turn Lanes (TWLTL).</p>	<p>a. Current Statewide average cost of a single turn arrow is approximately \$114.00 EA. b. Current Statewide average cost of a double turn arrows is approximately \$622.00 per mile of TWLTL placed at maximum spacing of 1500 feet.</p>	<p>PM(4)-10 removes the optional arrows for continuous two-way left turn lanes in accordance with Directive dated 02/26/2010.</p>	
<p>50. Develop recommendations to limit the placement of shield pavement markings to congested high speed corridors, difficult exits, high accident locations, etc.</p>		<p>Directive dated 02/26/2010 limits placement of Route Shield Pavement markings (RSPM) by established criteria for site selection and installation.</p>	<p>Reference Report No. FHWA/TX-10/0-5890-1 "Guidelines for Use of Pavement Marking Symbols at Freeway Interchanges."</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>51. Develop a policy to prohibit use of 6" stripe for main lane markings.</p>	<p>Savings based on current statewide average would be \$644.00 per mile of solid main lane edge line.</p>	<p>TRF is preparing a policy which limits the use of 6" wide pavement markings to main lanes of interstate highways and certain other controlled-access freeway facilities. TRF will modify PM(2)-08 & FPM(1)-08 as necessary to restrict the optional use of 6" wide pavement markings as required by the policy.</p>	<p>Other states are using 6" stripe on interstates only. State border districts prefer to match up to the neighboring states. No research has been found regarding the use of 6" stripe. It is still a preference to place 6" stripe on interstates.</p>
<p>52. Develop guidelines for use of transverse pavement markings in flush median gore areas. a. Solid white in exit gores. b. Solid yellow in turn lane gores.</p>	<p>a. Savings based on current statewide average would be \$2.85 per LF. b. Savings based on current statewide average would be \$2.85 per LF.</p>	<p>In accordance with Directive dated 02/26/2010, TRF issued PM(7)-10 and FPM(1)-(4)-10 which removes the requirement for exit gore diagonal markings.</p>	
<p>53. Recommend research proposal to determine best use of contrast edge stripe.</p>		<p>Research exists: March 2007 Report No. FHWA/TX-07/0-5008-2 "Evaluation of wet weather and contrast pavement marking applications". Research may need more clarification regarding contrast edge stripes.</p>	
<p>54. Recommend research proposal to determine if RRPMS should not be used on roadways posted at 45 mph or less.</p>	<p>Savings based on current statewide average would be approximately \$740.00 per mile of three lane roadway and \$370.00 per mile of two lane roadway.</p>	<p>Research exists: March 2007 Report No. FHWA/TX-07/0-5008-2 "Evaluation of wet weather and contrast pavement marking applications". Research, "...found that reflectorized raised pavement markings provided the most preview time under wet-night conditions."</p>	



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>55. Develop policy to prohibit use of rumble strips and profile pavement markings on roadways posted at 45 mph or less.</p>		<p>TRF issued RS(1)-(4)-10, and added Note 1 stating rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 mph or less. This complies with the Directive dated 02/26/2010.</p>	
<p>56. Develop recommendation to utilize more economical delineator posts.</p>		<p>TRF, MNT or CST to issue memo directing districts to bid more economical delineator and object marker post in construction projects and select more economical posts in maintenance operations. This directive will require the more economical delineator posts to be phased in to reduce labor costs and to maximize usage of existing concrete base installations.</p>	<p>Life cycle cost analysis is needed. Districts to start using less expensive alternatives based on the life cycle costs considerations: Advantages are lower material costs. Disadvantages are increased maintenance costs, plus there is a large investment in existing concrete stubs for recycled posts.</p>
<p>57. Develop policy (or proposal for research) to allow "Ice On Bridges" signs to remain visible all year.</p>		<p>After 1992 TxDOT took current position regarding "Watch for Ice On Bridge" signs & folding the signs up & down as the beginning and end of freeze period for a region.</p>	<p>See: State Department of Public Transportation c. Kitchen (Tex.App) 1992.</p>
<p>58. Develop a policy to discontinue use of internally lighted street name signs on new installations unless paid for by local entities or by outside agencies.</p>		<p>Directive dated 02/26/2010 prohibits the use of internally lighted street name signs on new installations unless paid for by a third party. TxDOT to phase out existing internally lighted street name signs at the end of existing signs' life cycle.</p>	



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>59. Use the latest formulation of water base paint to stripe during the seal coat season. Then return in six months-one year to stripe with thermoplastic.</p>	<p>The latest formulation of water base paint will last longer than regular water base and is cheaper than thermo. There will be fewer delays due to thermo stripers not being able to keep up with seal coat operations. History suggests the thermo stripe will be cheaper due to striping out of season (as much as 30%). Also, delaying the thermo stripe allows the chip seal to lay-down and helps prevent asphalt bleeding or tracking into the thermo stripe. Applicators will also find it easier to meet the thermo striping performance requirements through this policy, reducing delays, claims and ultimately further reducing the cost of the stripe.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p> <p>Recommend use of this as standard practice statewide.</p>	<p>CST and TRF is currently working on a policy to require this due to the use of lead-free thermo. Goal is to stripe seal coat with paint and set up another contract the next year to come back and stripe with thermo. Working with AGC to develop a policy.</p>
<p>60. Reconsider use of in-house striping.</p>	<p>Many areas in West Texas have few local striping contractors and pay a higher price to have contractors mobilize to those districts to perform striping. Cost increases ranging from \$500,000 up to \$4,000,000 annually have been reported.</p>	<p>Current Administrations' direction is use the most cost effective means.</p> <p>Recommend that districts with striping equipment be allowed to continue to utilize to stripe on low volume roadways and at the District Engineer's discretion.</p>	<p>Past Administration policy was to phase out in-house striping and not buy any new equipment. Until the districts or regions are allowed to purchase new equipment for striping, this cannot be implemented.</p>

Competition

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>61. Use delayed time start and flexible start date provisions. Allows smaller contractors to bid and adds efficiency opportunities.</p>	<p>Reduced contractor overhead and increased competition.</p>	<p>Directive dated 02/26/2010 requires Special Provisions to Item 8 which would allow work to start up to 60 or 90 days after written authorization to begin work.</p>	



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>62. Give more time for Contractor's plan review prior to letting.</p> <p>a. Web site with preliminary plans. More than one month. 6 to 8 weeks. Stamped with EPA requirements if needed, on Web.</p> <p>b. Consider release proposal and plans 2 weeks earlier.</p>		<p>DES to further address procedures with Administration for earlier release of preliminary plans. Districts currently have procedures for release of preliminary plans (See Amadeo Saenz' memo dated January 4, 2002 and Ken Bohuslav's memo dated June 11, 2002.)</p>	<p>Districts stated they have implemented or will implement.</p>
<p>63.</p> <p>a. For seal coat and ACP paving projects build some scheduling flexibility into the plans which would allow contractors to move crews from one project to another, with a goal of completing work within a given season.</p> <p>b. Develop a policy for district seal coat projects which requires contractors to submit a paving plan but also allows for suspensions of work and time charges. Such policy should incorporate following concepts:</p> <ol style="list-style-type: none"> (1) Contractor paving plan required. (2) AE sets time charges & resume date for suspensions. (3) Work carried over to the next season would be assessed Liquidated Damages (LD's) regardless of time availability. (4) Late out of season (fall) work permitted by TxDOT within time allowed would not be assessed LD's. 	<p>Such flexibility should allow contractors to better utilize their resources while still meeting TxDOT's goals of repaving roadways within a given season. This should increase competition.</p>	<p>b. Item 8 requires a detailed progress plan for construction projects and covers these requirements. A plan note has been developed which requires the contractor to submit s work plan and specifically addresses work related to the seal coat season. TxDOT Directive dated 02/26/2010 requires this plan note to be included in all Routine Maintenance Seal Coat Contracts in accordance with the Directive dated 02/26/2010 concerning this subject.</p> <p>A seal coat Preconstruction Meeting agenda has been developed by CST. It emphasizes each of the five issues addressed. This agenda is recommended to all districts as a guideline.</p>	<p>a. Specifications for HMA Items (Items 340, 341, 342, 344 and 346) address these ideas. They require a pre-paving meeting and a Quality Control Plan (QCP) to be submitted by the contractor before beginning production. The QCP addresses placement issues and may be revised per Engineer's approval. With regards to out of season paving, these specifications include criteria and language for weather conditions and allow the contractor to place mixtures when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.</p> <p>b. Some districts already enforce the requirement for a contractor paving plan.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>(5) Late out of season (fall) work permitted by TxDOT beyond time allowed would be assessed LD's.</p>			
<p>64. Create an “open for business” air.</p> <ul style="list-style-type: none"> a. Call contractors on release date to encourage bidders. b. Call contractors after the letting to determine why they didn't bid. c. Discuss plans and proposal with contractors to determine if there are issues with the contract that create difficulties or barriers to bidding. d. Issue addenda as needed. e. Welcome bidders in showing jobs. Be available for showing jobs. f. For unique work, such as special forms, discuss future projects. 		<p>Recommended practice for districts.</p>	<p>Districts stated they have implemented, will evaluate, or will implement many of the items listed. Some districts stated they use these ideas on unique or complicated projects.</p>
<p>65. Consider waiving prequalification on construction projects. (Waiver of prequalification is the default for construction projects less than \$300,000 and all RMC's.)</p>	<p>Prequalification cost a contractor at least \$2,000 to \$50,000. A compiled or reviewed financial statement (Bidders Questionnaire) is as little as a few hundred dollars. In addition, waiving the prequalification creates increased competition.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Districts state they use when appropriate. To clarify, this is a district decision and is submitted through DES. Some negative experiences from non-prequalified contractors when waivers were included in the letting. District commented that they waive for landscape projects where there is no work on the roadway.</p>
<p>66. Reconsider implementation of Value Engineering (VE) for the construction phase.</p>		<p>Administration has stated that while we should be open to contractor proposed changes, we do not currently have or propose to have a VE cost sharing special provision or cost sharing policy.</p>	<p>Administration stated that contractor proposed changes should be negotiated such that prices allow for a reasonable risk and profit.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>67. Use additive and deductive alternates. Must award on base bid or predetermined budget amount.</p>	<p>Helps getting a project awarded and staying on budget. Especially when we have third party funding.</p>	<p>Districts should consider for the type of projects addressed under "Response."</p>	<p>The department will consider the use of additive or deductive alternates for projects where third party funding, budget, and components are integral to the award. Until further notice, additive or deductive alternates will not be allowed for department let projects.</p> <p>Department letting systems have been revised to allow for use of additive and deductive alternates for special cases.</p>
<p>68. Reduce contract duration and scope, so risk is less. Even though long term may reduce cost. In some cases, with highly volatile items and resources, contractors have to put in more risk.</p>	<p>Although there is potential cost savings, there are frequently lower costs for longer term contracts because contractors can amortize equipment over a longer period of time. Volatile pricing situations, like we are in now, cause prices to escalate in longer term contracts because contractors are bidding in unknowns. We anticipate these will cancel each other out.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Districts stated they will evaluate and consider on a case by case basis.</p>
<p>69. Consider project size to increase competition.</p> <ul style="list-style-type: none"> a. Economy of scale, bundling or splitting projects. b. Area contractor capacity. c. Consider material source influences on competition. d. Consider subcontractor cost when bundling so odd work is not included. 	<p>In a previous review competition, generally across the state we saw an average number of bidders as follows: Less than \$10 M – 3 bids. \$10 M to 150 M – 5 bids. Greater than \$150 M – 1.5 bids.</p>	<p>Districts are directed to evaluate programs for potential efficiencies.</p>	<p>Districts stated they will evaluate and consider on a case by case basis.</p> <p>Recent lettings show good competition for all types of projects, averaging more than 6 bidders, except for specialty type work such as landscape.</p>
<p>70. Provide state yard and plant locations on-ROW or lease space off-ROW. Consider acquisition of yard sites for TxDOT that contractors could use for construction yards, etc.</p>		<p>Strongly recommended practice for districts.</p>	<p>Districts stated they have implemented and work with their contractors to address on a request basis. One districts state they lease off ROW sites and include plan information for on-ROW and off-ROW sites. One districts purchases land locked or remainders parcels for contractor yard and state stockpile use.</p>
<p>71. Update estimates. Use addendum to address barriers to bidding.</p>		<p>Recommended practice for districts.</p>	<p>Districts state they update their estimates. Several districts state they update their estimates one month prior to letting.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>72. Limit the requirement of state field offices on projects.</p>	<p>Cost savings results from eliminating state field office requirements from most projects.</p>	<p>Directive dated 02/26/2010 limits the requirement of field offices to specific exceptions which may be authorized by the District Engineer based on previous guidance given in Barton memo dated 09-08-2008.</p>	
<p>73. Encourage TxDOT Engineers to develop, sign and seal modifications to traffic control plans.</p>	<p>Proposals to modify a traffic control plan can often expedite project completion, reduce cost and/or improve safety and mobility during construction.</p>	<p>Directive dated 02/26/2010 gives guidance for TxDOT Engineers to develop, sign and seal modifications to traffic control plans when it is mutually beneficial to both the contractor and TxDOT.</p>	<p>AGC contractors expressed that having their engineer sign and seal carries significant risk. When TxDOT engineers refuse to develop, sign and seal modifications, contractors often abandon improved modifications which could be mutually beneficial to the contractor and TxDOT.</p>
<p>74. Quality of plans and information needed by contractors including available materials, yard, water, and base sources. Include photographs.</p>	<p>Contractors bid on projects with the best information available. If substantial field investigation is necessary or the contract is unclear about some provisions, the contractors bid higher to cover their cost of bidding on the project and manage their risk. Reducing the contractor's risk by improving the quality of information available in the plans would definitely save money. Construction and Maintenance Contracts amounted to \$5.6B in FY 2006. Assuming improved plans would result in a ½ % reduction in bid prices, annual savings would be \$26,500,000.</p>		<p>MNT and districts state they will consider the use of photographs on plans and provide videos on future projects. Some concern expressed that media quality of plans is insufficient for photographs. One district requires a certification of the accuracy of plans from consultants. One district is refining their plan review process. Some districts provide additional information of sources but do not make it contractual. Some districts provide willing landowner listings for borrow, water, yards, base, etc. to contractors prior to bids.</p>
<p>75. Consider appropriate time for project completion.</p>		<p>Districts are to use good engineering judgment for establishing practices.</p>	<p>Districts state they consider appropriate time. Some use good judgment for time through CPM analysis. Districts state they adjust for local conditions.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>76. Evaluate restrictive work hours and the effect of time to set up traffic control on production for daily operations.</p>		<p>For further district consideration.</p>	<p>Most districts don't use restrictive work hours and those that do, do on a case by case basis. Statements made that certain roadways only allow for restrictive work hours due to traffic volumes. Districts that use restrictive work hours account for lost production in their time for completion for the project.</p>

Project Scope

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>77. Appropriate Design for Projected Capacity</p> <p>a. Ensure that divided 4 lanes are being built that design year capacity justifies added lanes or divided facility. Designs can be phased in over time. This may address several rural connectivity projects.</p>	<p>a. Use of super 2 lane can save an estimated \$50 M on a 25 mile project versus of the cost of a divided 4 lane project. Recommended as an interim condition for roadways of less than 5,000 ADT and staggered passing lanes (not simultaneous as this could possibly eliminate future funding for trunk system criteria).</p>	<p>Districts may wish to discuss with Administration reduced scope and phased construction.</p> <p>Administration to consider further.</p>	<p>Some districts state they feel they have made a commitment to complete trunk system projects to the previous standards. Some state they will consider for future projects. Some districts stated they have already been using super two lane.</p>
<p>78. Consider potential bidders on projects of similar size and type of work. Let contracts with similar work on different days.</p>	<p>Increased competition may be achieved by looking statewide for similar contracts in close proximity and ensuring that they are let on different days.</p>	<p>It is recommended that a staff person knowledgeable with the contracting industry, competition and projects review and set day 1 and day 2 lettings for the Letting Management Group to lay out.</p>	
<p>79. Use minimums versus desirable when safety or the future improvements to the transportations system is not compromised.</p>		<p>This is an engineering decision that needs to be made based on each project. No policy is needed to change; it is at the discretion of the district now.</p>	<p>Districts state they will continue to use good engineering judgment.</p>



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Other

Idea	Potential Cost Savings	Implementation	Response/Comments
<p>80. Use HES funding to offset the cost of Rehabilitation projects either through scheduling sequential projects like some other states or through the combination of funding.</p>	<p>This would allow simple credit for safety work in rehabilitation projects.</p>	<p>Does not require a revision to policy, as this is currently allowed and encouraged to get economy of scale. However, the safety work will still require index justification.</p>	<p>See "Implementation" to the left. Districts state they try to do this as much as possible.</p>
<p>81. Require engineering consultants to follow TxDOT cost saving policies and guidelines to provide most cost effective designs when engaged in TxDOT plan preparation.</p>		<p>It is recommended that a joint CEC-TxDOT task force be formed to recommend cost savings guidelines for consultants to follow. Guidelines should include requiring competitive alternate bid items, use of salvageable materials, minimizing aesthetic treatments plus requirements to follow TxDOT cost saving policies and guidelines.</p>	
<p>82. Place all TxDOT design policies and guidelines under an easy-to-find website location.</p>		<p>It is recommended that all TxDOT design related policies and guidelines be placed on TxDOT's website under "Doing Business with TxDOT" so that it is easily assessable to consulting engineers, TxDOT employees, the contracting community and the public in general. This site would need to be updated on a regular basis.</p>	
<p>83. Include utility adjustments in contracts where appropriate to allow contractor to perform work and have more control over job scheduling.</p>	<p>There may be reduced utility relocation costs due to economy of scale of work performed. There may also be fewer contractor delays which may reduce TxDOT costs.</p>	<p>Community water and sewer line relocation normally is the best application. Negotiated agreements and proper coordination with utility owners, cities and/or counties is required.</p>	<p>In many cases the utility owners, cities and/or counties may be able to provide for utility relocation at a cheaper cost and it should be at their option.</p>



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Idea	Potential Cost Savings	Implementation	Response/Comments
<p>84. Need district carryover for 105 and 144 each year. Will allow a district to manage their work so they are not forced to let work or buy materials they don't necessarily need.</p>	<p>In strategy 105, no direct cost savings could be identified, however, this could possibly help to make the districts more efficient in their use of their budgets. In strategy 144, the districts already have this ability.</p>	<p>TxDOT already has the ability to carry unused Strategy 144 funds forward into the next fiscal year. Carryover of Strategy 105 funds would require changes in legislation.</p>	<p>Administration will consider for 105 statute changes legislative sessions.</p>
<p>85. Expand the use of non-freeway resurfacing or restoration projects (2R) to include higher non-freeways ADT <2500 or 3000 per lane.</p>	<p>Potential increase of over 10%. (There are 45,571 miles in the existing program and this would raise it up to 50,385 or 51,622 miles in the proposed program.)</p>	<p>Initial discussions with FHWA were positive to this increase. A formal letter and administration approval is needed.</p>	
<p>86. Expand the use of non-freeway resurfacing or restoration projects (2R) on non-freeway NHS with ADT <2500 per lane.</p>	<p>Adds a total of 4889 miles of NHS to the program, which represents another 10% increase.</p>	<p>FHWA had concerns for adding the NHS to the program with the existing safety checks. A written response from FHWA is expected soon with these concerns so TxDOT can address or provide synthesis or research through RTI.</p>	
<p>87. Eliminate individual transfer fees for NOI's, etc and do one for the entire state.</p>	<p>Administrative savings not quantified but recognized.</p>	<p>ENV approached both DSHS and TCEQ to explore opportunities to implement statewide annual payment of permit and notification fees. Neither agency was interested in advancing an annual payment option process. Online payment services have been established with DSHS and this reduced the time necessary to process the payments. TCEQ fees were already paid online.</p>	<p>The TCEQ, DSHS and TxDOT do not have mechanisms in place for managing annual statewide payments. Each agency would have to expand resources/costs to implement such a system. DSHS, in particular, had little interest in expanding resources to implement such a system, particularly for just one agency.</p>
<p>88. Use ENV scientific service contracts whenever possible instead of engineering contracts for hazardous material investigations and studies. Districts should coordinate with ENV's</p>	<p>ENV use of scientific services contracts for these services has resulted in cost savings of approximately 15% in labor rates and 26% on environmental drilling rates when compared to previous engineering contract rates. ENV has</p>	<p>Districts should contact ENV to utilize available contracts for hazardous material investigations and studies as well as for archaeological surveys. Districts should provide early coordination</p>	<p>Money is sometimes wasted when districts automatically scope unnecessary archaeological scientific surveys in engineering contracts.</p>



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<p>Archaeological Studies Branch prior to contracting through an engineering contract.</p>	<p>also directly contracted environmental laboratory services with vendors resulting in 35% cost reduction when compared to having these services performed as a subcontractor on engineering or scientific services contracts. ENV scientific services contracts typically provide better rates for archaeological surveys.</p>	<p>with ENV staff prior to contracting through an engineering contract.</p>	
<p>89. Consider elimination of subsidiary work that is essential to the bid item.</p>		<p>Districts should evaluate subsidiary work to ensure the value does not overwhelm the cost of the work or create undue risk on the contractor.</p>	<p>Districts state they take this into account in their PS&E development.</p>