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16. Abstract:

The objectives for this research – to identify and to effectively communicate best practices for pavement edge maintenance – were accomplished by capturing over 3700 years of institutional knowledge from maintenance leaders representing all 25 Districts of TxDOT. The research focuses on maintenance practices for naturally-occurring edge drop-offs with an emphasis on low-volume roads. The key factors causing edge drop-offs are narrow road width/ absence of shoulders, traffic volume/type, and adverse environmental conditions. *Tracy's Law*, "If you lose the edge, you lose the road," provides a key perspective on meeting these challenges and emphasizes that good edge maintenance strategy is not only important in achieving good roads, but without good edge maintenance, a District cannot achieve good roads. Edge maintenance practices and procedures fall into three broad categories: awareness, preventive maintenance, and edge repair techniques. Road widening – both in-house using TxDOT forces and by formal contract – emerged as the ultimate practice for long-term treatment of edge problems. Districts use conventional, in-house-modified, and commercially-manufactured equipment specifically dealing with pavement edge maintenance to address the edge drop-off issue. Due to the significant financial resources devoted to pavement edge maintenance, several tools are used to better plan and allocate edge maintenance funds.

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| 17. Key Words<br>Pavement Maintenance, Edge Drop-off, Shoulders, Preventive Maintenance, Edge Repair, Best Practices, FM Road System, Road Widening, Equipment, Planning, Materials, Specification | | 18. Distribution Statement | |
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# BEST PRACTICES FOR PAVEMENT EDGE MAINTENANCE DISTRICT SURVEY

by

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Prepared in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.

## Implementation Statement

This project identified best practices for pavement edge maintenance by capturing over 3700 years of institutional knowledge from TxDOT maintenance leaders. These best practices for pavement edge maintenance were communicated to over 500 TxDOT maintenance personnel through a series of half-day, regional training workshops covering the entire State. This initial training effort can be implemented more widely and deeply within TxDOT through on-going training and follow-on research efforts.

# SI* (MODERN METRIC) CONVERSION FACTORS

## APPROXIMATE CONVERSIONS TO SI UNITS

| Symbol | When You Know | Multiply By | To Find | Symbol |
|---|---|---|---|---|
| **LENGTH** | | | | |
| in | inches | 25.4 | millimeters | mm |
| ft | feet | 0.305 | meters | m |
| yd | yards | 0.914 | meters | m |
| mi | miles | 1.61 | kilometers | km |
| **AREA** | | | | |
| $in^2$ | square inches | 645.2 | square millimeters | $mm^2$ |
| $ft^2$ | square feet | 0.093 | square meters | $m^2$ |
| $yd^2$ | square yards | 0.836 | square meters | $m^2$ |
| ac | acres | 0.405 | hectares | ha |
| $mi^2$ | square miles | 2.59 | square kilometers | $km^2$ |
| **VOLUME** | | | | |
| fl oz | fluid ounces | 29.57 | milliliters | mL |
| gal | gallons | 3.785 | liters | L |
| $ft^3$ | cubic feet | 0.028 | cubic meters | $m^3$ |
| $yd^3$ | cubic yards | 0.765 | cubic meters | $m^3$ |

NOTE: Volumes greater than 1000 l shall be shown in $m^3$.

| | | | | |
|---|---|---|---|---|
| **MASS** | | | | |
| oz | ounces | 28.35 | grams | g |
| lb | pounds | 0.454 | kilograms | kg |
| T | short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |
| **TEMPERATURE (exact)** | | | | |
| °F | Fahrenheit temperature | 5(F-32)/9 or (F-32)/1.8 | Celcius temperature | °C |
| **ILLUMINATION** | | | | |
| fc | foot-candles | 10.76 | lux | lx |
| fl | foot-Lamberts | 3.426 | candela/$m^2$ | $cd/m^2$ |
| **FORCE and PRESSURE or STRESS** | | | | |
| lbf | poundforce | 4.45 | newtons | N |
| $lbf/in^2$ | poundforce per square inch | 6.89 | kilopascals | kPa |

## APPROXIMATE CONVERSIONS FROM SI UNITS

| Symbol | When You Know | Multiply By | To Find | Symbol |
|---|---|---|---|---|
| **LENGTH** | | | | |
| mm | millimeters | 0.039 | inches | in |
| m | meters | 3.28 | feet | ft |
| m | meters | 1.09 | yards | yd |
| km | kilometers | 0.621 | miles | mi |
| **AREA** | | | | |
| $mm^2$ | square millimeters | 0.0016 | square inches | $in^2$ |
| $m^2$ | square meters | 10.764 | square feet | $ft^2$ |
| $m^2$ | square meters | 1.195 | square yards | $yd^2$ |
| ha | hectares | 2.47 | acres | ac |
| $km^2$ | square kilometers | 0.386 | square miles | $mi^2$ |
| **VOLUME** | | | | |
| mL | milliliters | 0.034 | fluid ounces | fl oz |
| L | liters | 0.264 | gallons | gal |
| $m^3$ | cubic meters | 35.71 | cubic feet | $ft^3$ |
| $m^3$ | cubic meters | 1.307 | cubic yards | $yd^3$ |

| | | | | |
|---|---|---|---|---|
| **MASS** | | | | |
| g | grams | 0.035 | ounces | oz |
| kg | kilograms | 2.202 | pounds | lb |
| Mg (or "t") | megagrams (or "metric ton") | 1.103 | short tons (2000 lb) | T |
| **TEMPERATURE (exact)** | | | | |
| °C | Celcius temperature | 1.8C + 32 | Fahrenheit temperature | °F |
| **ILLUMINATION** | | | | |
| lx | lux | 0.0929 | foot-candles | fc |
| $cd/m^2$ | candela/$m^2$ | 0.2919 | foot-Lamberts | fl |
| **FORCE and PRESSURE or STRESS** | | | | |
| N | newtons | 0.225 | poundforce | lbf |
| kPa | kilopascals | 0.145 | poundforce per square inch | $lbf/in^2$ |

* SI is the symbol for the International System of Units. Appropriate

(Revised September 1993)

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