Technology Challenges Within Transportation Safety Among Several Indian Reservations

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OVERVIEW

- Introduction
- Background
- Objectives
- 3 Case Studies
- Conclusions

Challenges Among the 4Es
- Engineering
- Enforcement
- Education
- Emergency Medical Services (EMS)
INTRODUCTION

▪ One person will die every 16 minutes in a traffic crash

▪ National Highway Strategic Safety Plan
  ▪ Vision of TZD (Towards Zero Deaths)

▪ Strategic Highway Safety Plans
  ▪ Federal, State, Local, & Tribal Safety Stakeholders
  ▪ Data driven, multi-year comprehensive plans
  ▪ Engineering, Education, Enforcement, & EMS
BACKGROUND

- Crash Rates on Tribal Lands

**FATAL CRASHES**
- Leading cause of death among Native Americans
- 63% age 35 years or younger
- 65% alcohol related
- 42% related to speeding
- Only 16% properly restrained

- States Implement SHSP
  - Tribes following similar procedure
  - Lapse in resources expertise formerly assumed by State and Federal government
  - Lapse in resources relay to many different challenges affecting the 4Es
  - Critical needs addressed through partnerships
OBJECTIVES

▪ Present Challenges Tribes are Facing in the Region

▪ Review Challenges that Face:
  ▪ Law Enforcement
  ▪ Engineering
  ▪ Education
  ▪ Emergency Medical Services (EMS)

▪ Present Case Studies from 5 Separate Tribes in the Rocky Mountain and Northern Plains Region
CHALLENGES

To address specific challenges on Tribal Lands the 4Es must be considered

- Engineering
- Enforcement
- Emergency
- Education

Challenges to Tribal Safety

4 E's of Traffic Safety

- Crash Reporting
- Employee Retention + Turnover
- Infrastructure
- Cross-Deputization
- Rural Nature of Roadways
- Drugs/Alcohol
- Emergency
- Writing for Grants/Funding
- Safety Restraints

- Response Time
ENGINEERING CHALLENGES

- Infrastructure
  - Unpaved/Paved Roadways
  - Low Volume Roads
  - Narrow lane widths
  - Narrow shoulders
  - No rumble strips
  - Lack of Advanced Warning Signs

- Geometric Design
  - Sharp curves
  - Poor Sight Distances

- Crash Analysis
  - Deficiencies in reporting
  - Incompatible inventories
  - Difficult to complete accurate analysis and trends
ENFORCEMENT CHALLENGES

▪ Statistics show American Indians/Alaskan Natives experience violence victimization at a rate that is twice the national average

▪ Overlaps in judicial authority prevent Indian Country’s justice systems from protecting the safety of their communities

▪ Indian Country law enforcement operate with 55 – 80% of resources

▪ Low employee retention and high officer turnover rates

▪ Deputization agreements
EMERGENCY MEDICAL SERVICES

CHALLENGES

- EMS responds to 15 million emergency events a year
- Indian Health Services (IHS) supports federally funded, tribally operated EMS
- Federally supported services serves 57% of the total tribal population in 25 states
- Rural and remote communities
- Community members must travel long distances for health and social services
- Golden Hour
EDUCATIONAL CHALLENGES

▪ Driving Behavior
  ▪ Distracted Driving
  ▪ Impaired Driving
    ▪ Drugs & Alcohol
  ▪ Misuse of Safety Restraints
    ▪ Child Restraints

▪ Lack of Resources

▪ More Awareness

▪ 3 out 4 passengers who died in car crashes on reservations were not wearing a seatbelt

▪ AI/AN children have the highest traffic death rate of any racial/ethnic group

▪ 2 out of 3 crashes on reservations are related to drunk driving
BUCKLE UP!
Every Person, Every Seat, EVERY TIME.

Learn more at
www.cdc.gov/motorvehiclesafety/native/index.html
or call 1-800-CDC-INFO

ROADWAY TO SAFER TRIBAL COMMUNITIES

Protect Our FUTURE
Use child safety seats on every ride.

Learn more at
www.cdc.gov/motorvehiclesafety/native/index.html
or call 1-800-CDC-INFO

ROADWAY TO SAFER TRIBAL COMMUNITIES

Your Decision, THEIR LIVES.
If you’ve been drinking, don’t drive. Get a ride.

Learn more at
www.cdc.gov/motorvehiclesafety/native/index.html
or call 1-800-CDC-INFO
“Everything/Everyone Else” CHALLENGES

- Maintenance
- Safety and Security of the Infrastructure
  - Signs
  - Detectors
  - Signals
- Vehicle Manufacturers
- Insurance
- Universities and Colleges
- Consulting
  - Analytics
  - Software
- Advocates for Behavioral Concerns
CASE STUDIES

▪ Background
  ▪ WYTT/LTAP & WYDOT
  ▪ High Risk Rural Roads Program
  ▪ Wyoming Rural Roads Safety Program
    ▪ Local Governments
  ▪ Develop similar methodology for Tribal Lands
    ▪ Results in Low Cost Safety Improvements
CASE STUDIES

▪ **Wind River Indian Reservation**
  - Northern Arapahoe & Eastern Shoshone Tribes
  - 2.2 Million Acres
  - Total BIA Inventory of 1,227.8 miles
    - Only 174.7 paved miles
  - State maintains roughly 200 miles of US and state highways
CASE STUDIES

▪ **Fort Peck Indian Reservation**
  ▪ North Eastern Montana
  ▪ ~ 2 million acres
  ▪ Assiniboine and Sioux Tribal Members
    ▪ About 12,000 enrolled members
  ▪ 1,500 miles of roads
    ▪ 375 miles of BIA/Tribal owned roads
    ▪ Of the 211 BIA roads, over half are unpaved
Case Studies

- **Standing Rock Sioux Reservation**
  - Standing Rock Sioux Tribe
  - People of the Dakota and Lakota Nations
    - 13,000 people w/ 5,000 non-Indians
  - 2.3 Million Acres
  - Maintain 128 miles of tribal roads
    - Maintain 232 miles of BIA roads
    - Respective state highways
CASE STUDIES

▪ **Sisseton Wahpeton Oyate Reservation**
  ▪ North Eastern Side of South Dakota
  ▪ 108,000 acres of land
  ▪ Dakota Nation
    ▪ 9,894 enrolled Tribal members

▪ **Yankton Sioux Reservation**
  ▪ South-Central South Dakota
  ▪ 40,000 acres of land
  ▪ Dakota Nation
    ▪ 4,500 enrolled Tribal members
CASE STUDIES

▪ Engineering
  ▪ Poor road conditions, lack of advanced warning signage, missing/repair guardrail, faded pavement markings, narrow shoulders, missing rumble strips

▪ WRIR Local Roads
  ▪ Used 5 Step methodology from WRRSP
  ▪ Collaboration between WYDOT, WYTT/LTAP, WRIR, WRIR Law Enforcement, NPTTAP
    ▪ Modified to meet Tribes needs
    ▪ 5 Steps
CASE STUDIES

- 5 Step Process
  - Crash Data Analysis
  - Level 1 Field Evaluation
  - Combined Ranking
  - Level II Field Evaluation
  - Benefit-Cost Analysis

- WRIR Local Roads Cont.
  - Lack of crash locations on IRR
  - Systematic Approach
CASE STUDIES

- **WRIR Local Roads Cont.**
  - Tribes reviewed list for improvements

<table>
<thead>
<tr>
<th>Road</th>
<th>Benefit</th>
<th>Cost</th>
<th>B/C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eight Mile Road</td>
<td>$2,962,691</td>
<td>$7,417</td>
<td>399.46</td>
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<tr>
<td>Riverview Road</td>
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<td>Ethete Road</td>
<td>$2,657,358</td>
<td>$27,017</td>
<td>98.36</td>
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<tr>
<td>North Fork Road</td>
<td>$3,585,894</td>
<td>$36,863</td>
<td>97.28</td>
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<td>Trout Creek Road</td>
<td>$2,421,742</td>
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<td>Burma Road</td>
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<td>$16,640</td>
<td>75.89</td>
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<tr>
<td>South Fork Road</td>
<td>$1,117,816</td>
<td>$31,600</td>
<td>35.37</td>
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<tr>
<td>Pingetzer Road</td>
<td>$145,392</td>
<td>$7,750</td>
<td>18.76</td>
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<tr>
<td>Hutchinson Road</td>
<td>$57,600</td>
<td>$3,400</td>
<td>16.94</td>
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<tr>
<td>Kinnear Spur Road</td>
<td>$130,447</td>
<td>$8,100</td>
<td>16.10</td>
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<tr>
<td>Cliff Road</td>
<td>$14,281</td>
<td>$5,600</td>
<td>2.55</td>
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<tr>
<td>Peterson Road</td>
<td>$29,137</td>
<td>$14,600</td>
<td>2.00</td>
</tr>
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</table>

**IRR Roads**

- System Wide Improvements
- County Roads
- Five Step Process

<table>
<thead>
<tr>
<th>IRR Roads System-Wide Improvements</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs</td>
<td>$140,114</td>
</tr>
<tr>
<td>Pavement Marking</td>
<td>$125,539</td>
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<tr>
<td>Guard Rail</td>
<td>$14,815</td>
</tr>
<tr>
<td>Total</td>
<td>$280,468</td>
</tr>
</tbody>
</table>
CASE STUDIES

**Northern Plains Tribes Selection Criteria**

- The Tribe should be willing to invest the energy necessary to work with WYT²/LTAP and NPTTAP throughout the process and commit the needed resources. The main resources needed are individuals willing to spend the time to meet with WYT²/LTAP, provide personnel to assist with field reviews and provide feedback.

- Crash data is critical to addressing safety improvements. The interested reservation needs to have the ability to provide at least three years of crash data as well as provide WYT²/LTAP and NPTTAP access to that data. WYT²/LTAP can work with limited crash data but needs to have enough to determine problem areas and trends.
CASE STUDIES

▪ Northern Plains Tribes Selection Criteria

▪ Collaboration is key to the success of this program. The Tribe needs to have the ability to work with the state DOT, law enforcement (state, county and tribal), reservation road and transportation office or designated Tribal member able to make decisions on behalf of the Tribe concerning roadway matters.

▪ The Tribe would need to provide information about any existing strategic plan or initiatives in place to address roadway safety.

▪ Most of all, the Tribe must have a desire to improve roadway safety on their reservation.
CASE STUDIES

- **SRST Local Roads**
  - Submitted an application
  - Initial meetings were held
  - Reservation lies within 2 states
  - Level I and II were done simultaneously
<table>
<thead>
<tr>
<th>Highway</th>
<th>Project</th>
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</thead>
<tbody>
<tr>
<td>ND 24</td>
<td>Install Chevrons</td>
</tr>
<tr>
<td></td>
<td>Install Intersection Ahead Signs</td>
</tr>
<tr>
<td></td>
<td>Install Guardrail</td>
</tr>
<tr>
<td>ND 1806</td>
<td>Install Deer Xing Signs</td>
</tr>
<tr>
<td>Big Lake Road</td>
<td>Widen Roadway at Bridge</td>
</tr>
<tr>
<td>113 ST</td>
<td>Install Rumble Strip</td>
</tr>
<tr>
<td>BIA 44</td>
<td>Install Curve Warning Signs w/ Advisory Speed</td>
</tr>
<tr>
<td></td>
<td>Install Stop Ahead/RR Xing Ahead</td>
</tr>
<tr>
<td>BIA 3</td>
<td>Change Speed Limit Sign</td>
</tr>
<tr>
<td></td>
<td>Install Curve Warning Signs</td>
</tr>
<tr>
<td></td>
<td>Install Chevrons</td>
</tr>
<tr>
<td>BIA 3</td>
<td>Realign 100 Street</td>
</tr>
<tr>
<td>US 12</td>
<td>Install Advisory Speed Signs*</td>
</tr>
<tr>
<td></td>
<td>Install Chevrons</td>
</tr>
<tr>
<td>US 12</td>
<td>Install Advanced Warning Flashers*</td>
</tr>
<tr>
<td>Honky Tonk Road</td>
<td>Install Intersection Ahead Sign</td>
</tr>
<tr>
<td></td>
<td>Install Double Arrow Sign</td>
</tr>
</tbody>
</table>
**CASE STUDIES**

- **YST and SWO Local Roads**
  - Initial data did not include mile posts
  - Preliminary Crash Ranking
  - Revised after Level I Field Evaluation for MP
  - Level I and II were done simultaneously

![Diagram showing the process from YST/SWO Safety Evaluation to Provide List of Projects to Tribe]
CASE STUDIES

- **FPIR Local Roads**
  - Initial data did not include mile posts
  - Reviewed Crash Data and selected Tribally owned roads as target
  - List of top 15 with 2+ crashes

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<thead>
<tr>
<th>Road</th>
<th>Cost</th>
<th>Benefit</th>
<th>B/C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackson Rd 1</td>
<td>$15,300</td>
<td>$1,248,880</td>
<td>81.63</td>
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<tr>
<td>Road 1053</td>
<td>$71,100</td>
<td>$4,021,401</td>
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<tr>
<td>6th Avenue</td>
<td>$1,200</td>
<td>$36,000</td>
<td>30.00</td>
</tr>
<tr>
<td>BIA Route 14</td>
<td>$48,000</td>
<td>$1,220,920</td>
<td>25.44</td>
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<tr>
<td>BIA Route 1</td>
<td>$661,800</td>
<td>$11,401,452</td>
<td>17.23</td>
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<tr>
<td>Road 1074</td>
<td>$104,850</td>
<td>$1,276,840</td>
<td>12.18</td>
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<tr>
<td>Road 1072</td>
<td>$115,500</td>
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<tr>
<td>Frazer Rd S</td>
<td>$10,050</td>
<td>$77,066</td>
<td>7.67</td>
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<tr>
<td>BIA Route 168</td>
<td>$11,325</td>
<td>$80,919</td>
<td>7.15</td>
</tr>
<tr>
<td>Road 2065</td>
<td>$11,700</td>
<td>$30,756</td>
<td>2.63</td>
</tr>
<tr>
<td>Oswego Rd N</td>
<td>$193,350</td>
<td>$61,687</td>
<td>0.32</td>
</tr>
<tr>
<td>Frazer Rd N</td>
<td>$182,400</td>
<td>$30,756</td>
<td>0.17</td>
</tr>
<tr>
<td>Lustre Rd</td>
<td>$0</td>
<td>$0</td>
<td>0</td>
</tr>
</tbody>
</table>
First Harmful Event

Crash Percentage

Animal: 42% WRIR
        41% FPIR
        22% SRST
        20% YST
        6% SWO

Fixed Object: 20% WRIR
              19% FPIR
              17% SRST
              15% YST

Motor Vehicle: 44% WRIR
               21% FPIR
               22% SRST
               21% YST
               17% SWO

Non-Collision: 29% WRIR
               18% FPIR
               17% SRST
               15% YST
               18% SWO

Pedestrian: 26% WRIR
            25% FPIR
            18% SRST
            17% YST

Other: 12% WRIR
      2% FPIR
      2% SRST
      1% YST
      1% SWO

0% 5% 10% 15% 20% 25% 30% 35% 40% 45% 50%

WRIR  FPIR  SRST  YST  SWO
Safety Restraint Usage

Proper Usage
- WRIR: 34%
- FPIR: 39%
- SRST: 42%
- YST: 41%
- SWO: 54%

Improper Usage
- WRIR: 26%
- FPIR: 33%
- SRST: 21%
- YST: 17%
- SWO: 12%

Not Specified
- WRIR: 40%
- FPIR: 28%
- SRST: 29%
- YST: 38%
- SWO: 47%
Average Level I Segment Score

<table>
<thead>
<tr>
<th>TRIBE</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPR</td>
<td>36.2</td>
</tr>
<tr>
<td>WRIR</td>
<td>33.8</td>
</tr>
<tr>
<td>SRST</td>
<td>35.2</td>
</tr>
<tr>
<td>YST</td>
<td>26.5</td>
</tr>
<tr>
<td>SWO</td>
<td>19.8</td>
</tr>
</tbody>
</table>
CASE STUDIES

▪ Enforcement
  ▪ Cross Jurisdictional/ Cross Deputization

▪ FPITR Law Enforcement
  ▪ Cross Deputized
  ▪ 1,200 Dispatch calls a month
  ▪ 18 Tribal Officers, 15 County Officers, 5 City Officers, 5 MHP
  ▪ 95% turn-over rate
  ▪ Focus on Drugs/Alcohol
CASE STUDIES

▪ Education

▪ **FPIR Driver Awareness and Education**
  ▪ Relationships with other entities
  ▪ Safe on All Roads
    ▪ Increase seatbelt awareness and decrease impaired driving
    ▪ “Buckle Up Because You Love Me”
    ▪ Check Points
    ▪ Donated child safety restraints to new families
CASE STUDIES

▪ **EMS**
  ▪ Long Distances, Few Resources, Poor Road Conditions

▪ **FPIR EMS**
  ▪ 41% of population within 5-mile proximity
  ▪ 47% of population within 10 mile proximity
  ▪ 2 Ambulances → run over 52,000 miles in one year
    ▪ Average of 5 calls a day
CONCLUSIONS

- Many reservations struggle with the challenges that face:
  - Engineering
  - Enforcement
  - Education
  - EMS
  - Everyone Else

- Tribes can relate to several of the common challenges
  - Learn from other solutions
CONCLUSIONS

▪ For Tribal Transportation and Technology to be a success there must be active communication

▪ Extensive coordination efforts

▪ Full cooperation between the many agencies involved

▪ Every Tribe and reservation is different
  ▪ Separate needs should be acknowledged
  ▪ One solution may not work for another Tribe and the context of their culture
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