PUBLIC WORKS & Pavement Management
THIS ROAD NEEDS HELP

This earthquake damaged road is NOT in Kittitas County
PAVEMENT MANAGEMENT

• Pavements represent the largest capital investment in any modern highway system. Kittitas County’s Transportation Infrastructure is it’s most major – it’s greatest – investment.

• Maintaining and operating roads typically involves complex decisions about how and when to resurface or apply other treatments to keep the road performing, and keep operating costs at a reasonable level.

• Traditional methods left these decisions up to a Road Supervisor who would select treatment based on his extensive knowledge & experience.

• Rarely are there enough funds to complete all identified road repairs.
A Pavement Management System

A pavement management system consists of 3 parts:

1. A system to regularly collect road condition data;

2. A computer database to store and sort the collected road data;

3. An analysis program to evaluate pavement preservation strategies and suggest cost-effective projects to maintain road conditions.
Data collection ranges from “Windshield Surveys” to the use of testing vehicles. Kittitas County usually relies on the “Windshield Survey” method.

Some of the most important data collection is done by those individuals who are always out in the field: the Road Supervisor, Road Foremen, and the Road Crews.
REPORT PROBLEMS WHEN YOU SEE THEM
Kittitas County’s Data Collection System

Public Works uses Windshield Surveys in conjunction with the County Road Administration Board’s VisRate Program:

• **VisRate**

• VisRate is a software program used to analyze pavement condition for all paved County roads. The pavement cracks are located and summarized in this program. The important types of cracks are called: Longitudinal - running parallel to the centerline of the road; Transverse - running across the road. These cracks are the beginning of alligator cracking. They are rated by their severity: low, medium, or high. Distresses for user-defined segments of pavement are recorded and saved in a local database.
LOW SEVERITY LONGITUDINAL CRACK
MEDIUM SEVERITY
LONGITUDINAL CRACK
HIGH SEVERITY TRANSVERSE CRACK
Extremely high severity longitudinal crack – in Japan after an earthquake
SEVERE ALLIGATOR CRACKING
Alligator cracking is a fatigue cracking usually associated with loads, and usually limited to areas of repeated traffic loading. Alligator cracks start out as a series of parallel longitudinal cracks, and progress with time and loads to an interconnecting, branching pattern of cracks.

In high severity alligator cracking, pieces of pavement may be missing.

Alligator cracks progress quickly to the dreaded POTHOLE. We all know how the driving public feels about potholes.
GIANT POTHOLE SWALLOWS CAR. REPAIRS DELAYED DUE TO BUDGET CUTS.
How We Use VisRate

Public Works uses VisRate software to take pavement condition ratings while driving the roads: one person rates while the other enters the numbers into the laptop.

• Counting the distresses in a small section of pavement, the rater calculates the severity of the distress, whether it is cracking, patching, alligator cracking, rutting, raveling, or sagging, and the information is entered for that section of road. In this way the progressive deterioration of each segment of paved roadway is documented.
• The collected data is downloaded at the office into the MOBILITY Program. Many years of data on pavement conditions and traffic counts can be used to help determine the direction of Kittitas County’s Pavement Management Program.

• The information is now in the system for analyzing and determining maintenance and rehabilitation requirements, for projecting priorities, and for conducting long-term planning.
MOBILITY

- **Mobility** is a computer database that we feed data into, such as pavement condition, accidents, pavement types, pavement age, width, thickness, ADT’s (average daily traffic), etc., and that we can also feed data into such as the location of every culvert, bridge, sign, and approach.
MOBILITY IS OUR ANALYSIS SYSTEM

• MOBILITY is capable of producing reports showing the roads with the lowest pavement surface ratings, the most accidents, the highest use, combinations of these factors, etc, etc.

MOBILITY is a very useful tool for Public Works. The reports that can be run from MOBILITY are extremely useful for planning purposes.
Traffic Count screen from MOBILITY for Airport Road in Cle Elum- generated after the counts are entered.
How the Analysis Program Works

• To analyze the collected data so that it can be used to decide which roads need urgent care the soonest, we prioritize those roads with the worst surfaces, the heaviest traffic counts, and the oldest pavement, for example.

• A poor surface condition rating, paired with a high traffic count could mean that the road would be high on the chip seal list for the next year.

• MOBILITY contains a program called DECISION TREE which could aid the County in prioritizing roads for preservation work. Pavement Surface Condition Ratings, the type and age of the pavement, and the average of several years of traffic counts are all factors placed into the Decision Tree program.

KITTITAS COUNTY HAS ALL THREE OF THE NECESSARY PARTS OF A GREAT PAVEMENT MAINTENANCE SYSTEM, INCLUDING A VERY KNOWLEDGABLE ROAD SUPERVISOR, WHO IS A PART OF THE DATA COLLECTION SYSTEM.
The Role of the Road Supervisor

The County Road Supervisor works under the direction of the Public Works Director, with considerable latitude for discretion and judgment in the administration of goals and objectives in supervising and evaluating the construction and maintenance of county roads, among many other duties. He is part of the system collecting road condition data, and he does this on a daily basis.

The knowledge and experience of such a current long-term employee in this position is invaluable to the Public Works Department.

Combining this human database with the computer database can be a very powerful tool for great road preservation strategies!
PAVEMENT MAINTENANCE

PAVEMENTS DETEriorATE VERY SLOWLY DURING THE FIRST FEW YEARS AFTER PLACEMENT, AND VERY RAPIDLY WHEN THEY ARE AGED.

GOVERNMENTS INVEST MORE FUNDS IN ROAD MAINTENENCE THAN FOR ANY OTHER PUBLIC PURPOSE. SUCCESSIVE YEARS OF PAVEMENT DATA COLLECTION HAVE SHOWN THAT IT IS FAR MORE ECONOMICAL TO PRESERVE ROADS THAN TO DELAY REPAIRS AND RECONSTRUCT THE ROADS.

BASED ON HISTORICAL COSTS, KITTITAS COUNTY’S ROAD SYSTEM, INCLUDING SIGNALS, SIGNS, BRIDGES, AND GUARD RAILS, IS VALUED AT $148, 756,499.00. IN TODAY’S VALUES THAT FIGURE WOULD BE MUCH HIGHER.
PAVEMENT DETERIORATION CHART
(TIME AT THE BOTTOM IS IN "YEARS")

- GOOD
- SATISFACTORY
- FAIR
- POOR
- VERY POOR
- SERIOUS
- FAILED

TIME

$1.00 FOR REHABILITATION HERE

SIGNIFICANT DROP IN CONDITION

SMALL % OF PAVEMENT LIFE

WILL COST $4.00 TO $5.00 HERE
CHIP SEAL

A thin film of heated asphalt liquid is sprayed on the road surface, followed by the placement of small aggregates ("chips"). The chips are then compacted for maximum adherence to the asphalt.

Chip Sealing costs about one fourth to one fifth the cost of conventional asphalt overlay. Chip sealing helps to extend the time between asphalt overlays. It helps provide a moisture barrier for the underlying pavement and protects that pavement from deterioration due to sun and water. Chip sealing also enhances safety by providing good skid resistance. Usually this method is used only on low traffic routes.

Kittitas County has its roads on a seven year chip seal rotation program.
CHIP SEALING IN PROGRESS
OTHER PUBLIC WORKS PRIORITIES

Pavement Marking, or striping is done on an annual basis on Kittitas County roads.
Pavement marking, or Striping, is placed on County Roads according to Kittitas County Policy:

Center Line stripes SHALL be placed on all Major and all Minor Collector Routes. Our policy reads that Center Line Stripes SHOULD be placed on paved 2-way roads with the following characteristics:

1. Local Access road with traffic volume greater than a 500 ADT
2. or a continuation of a connecting collector route
3. or as directed by the Engineer for safety issues.

Edge Line Stripes SHALL be placed on paved, 2-way traveled roads on:

1. All major collector routes
2. Minor collector routes with a pavement width greater than or equal to 22 feet
   AND a traffic volume greater than a 500 ADT.

Edge line stripes SHOULD be placed on paved, 2 way traveled roads that are a continuation of a connecting roadway section with edge line markings.

Other factors to look at in striping are accident history, speed limit, sight distance and curves.
FRESH PAVEMENT MARKINGS MAKE ALL THE DIFFERENCE, ESPECIALLY TO VISIBILITY IMPAIRED DRIVERS
Traffic signs aid in traffic safety, controlling speeds, marking curves, and aiding motorists in many ways. Signs on County Roads are installed and maintained by Kittitas Public Works Department.
By the year 2020 one fifth of our population will be 65 or older, and driving!

- Older drivers need more light to see what they saw well at age 20: at age 65 they need 13 times the light they needed at age 20. (from WSDOT) This has prompted the new Manual on Uniform Traffic Control Devices sign retroreflectivity requirements. Agencies must establish and implement a sign management method to maintain minimum levels of sign retroreflectivity by January, 2012.
RETRO REFLECTIVITY: WHAT DOES THIS MEAN?

- Retro reflectivity describes how light is reflected from a surface. Traffic signs use technology with small glass beads or prismatic reflectors that reflect the light from vehicle headlights back to the vehicle and the driver’s eyes, making the sign appear brighter and more visible to the driver.

- Kittitas County must measure the retro reflectivity of its traffic signs by conducting inspections, most effectively at night. Inspection results must be kept and tracked. Any sign not legible to the inspector must be replaced as soon as possible.

- Generally agencies perform sign inspections on an annual basis.
Pavement management and the Washington state growth management act

- **GMA Goals**
  - GMA plans and regulations are to be guided by 14 goals that are summarized below:
  - Focus urban growth in urban areas.
  - Reduce sprawl.

- **Provide efficient transportation.**
  - Encourage affordable housing.
  - Encourage sustainable economic development.
  - Protect property rights.
  - Process permits in a timely and fair manner.
  - Maintain and enhance natural resource-based industries.
  - Retain open space and habitat areas and develop recreation opportunities.
  - Protect the environment.
  - Encourage citizen participation and regional coordination.
  - Ensure adequate public facilities and services.
  - Preserve important historic resources.
  - Manage shorelines wisely.

From the Wash. State Dept. of Commerce GMA website
Providing “Efficient Transportation” is the THIRD guiding goal of the GMA.

Kittitas County’s Comprehensive Plan, Chapter 4, sets out the goals, policies and objectives for the County’s Transportation System:

**GPO 4.4**
Kittitas County shall provide a transportation system that enhances the safety of the community and which maximizes the use of the existing road system by maintaining a system of arterials, collectors and local access roads that forms an interconnected network for vehicular circulation.

**GPO 4.5**
To Provide all-weather, all-season use of the arterial system, for the movement of goods and services.

NEITHER OF THESE GOALS COME CHEAP
ROAD REVENUES

FUNDING FOR ROAD MAINTENANCE DOES NOT GROW ON TREES.

In the State of Washington, the state motor vehicle fuel tax (MVFT), currently 37.5 cents/gallon, is shared among the cities, counties and the State Department of Transportation. This includes a dedication of a portion of the MVFT to grant programs managed by the County Road Administration Board (CRAB) and the Transportation Improvement Board (TIB). The most recent MVFT increase was primarily dedicated to the Transportation Partnership Account (TPA) utilized for legislatively selected transportation projects.

Unfortunately, all tax revenues are currently diminished.

(INFORMATION FROM THE COUNTY ROAD ADMINISTRATION BOARD)
Between the Rural Arterial Program (RAP), the County Arterial Preservation Program (CAPP), and the regular county distribution, counties receive a share approximately equal to 5.96 cents per gallon, plus a small amount from the TPA dedicated to CAPP. The county total share of the MVFT is approximately 16% of the net state fuel taxes collected. State law describes the basic processes and authorities to perform the biennial and annual update calculations, with CRAB having the responsibility to perform these calculations pertaining to the counties' share of MVFT.
Property taxes & road revenues

Over one-third of the revenues dedicated to county roads are generated from local property taxes.

The authority to levy property tax is codified in **RCW 84.52.043**; the road fund levy is specifically expanded upon in **RCW 36.82.040**.
OUR ULTIMATE GOAL IS TO PROMOTE TRAFFIC SAFETY & PREVENT ACCIDENTS LIKE THIS ONE IN CENTRAL FLORIDA