



Basic Signal Upgrades

General Information

Upgrades at signalized intersections can include any number of elements. They can range from adding reflective strips to the signal head back plates to changing the left turn type. The countermeasure implemented at each intersection should be appropriate to mitigate the type(s) of crash(es) occurring at the intersection.

FHWA, working with ODOT, created a list of typical improvements for signalized intersections that should be considered. It was compiled into a portion of the report *Oregon Intersection Safety Implementation Plan* in June of 2012. According to the report this safety measure “involves the installation of a basic set of signal, sign, and marking improvements that are low-cost...” Some of these low cost countermeasures are listed below:

- ✓ Addition of Pedestrian Countdown Heads
- ✓ Replacing a tradition 5-section, doghouse signal head with a Flashing Yellow Left Turn Arrow (FYLTA).
- ✓ Adding back plates to all signal heads
- ✓ Upgrading to 12” LED lenses on signal heads *
- ✓ Having at least one signal head per lane
- ✓ Addition of reflective strips on back plates of signal heads
- ✓ Upgrading to protected only left turn phasing
- ✓ Addition of near-side signal heads

ODOT - Specific Costs

In Oregon, some updates such as the ones listed above can be installed utilizing ODOT maintenance and electrical staff. By using ODOT forces, the cost to update signalized intersections is minimized. Listed below are basic costs when installed using ODOT forces.

- ✓ Pedestrian Count Down Heads: \$520
- ✓ Doghouse to FYLTA: \$1500
- ✓ Back Plates for Signal Heads: \$200
- ✓ 12” LED Lenses: \$500 (just swapping existing lenses to LED lenses)
- ✓ Additional Signal Head: \$1400
- ✓ Reflective Strip on Back Plates: \$250

* There is currently no CRF for only upgrading to LED lenses. This reduction factor is related to updating from 8” signal head to a 12” signal head.

By the Numbers

Overall, FHWA estimates that implementing a basic set of upgrades to an existing signal will result in an overall crash reduction, at the intersection, of 20%. Each of the listed countermeasures has a crash reduction associated with it. Below is a breakdown of each countermeasure and its estimated effect:

- ✓ Pedestrian Countdown Heads: 25% reduction in overall crashes.
- ✓ Doghouse to FYLTA: 25% reduction in left turn related crashes.
- ✓ Improve Signal Hardware:
 - Back plates on signal heads: 13% crash reduction in overall crashes, 50% reduction in angle crashes
 - Signal head/lane: 46% reduction of angle crashes
 - Reflective strip on back plate: 15% reduction in overall crashes
- ✓ Protected LT Phasing: 6%-22% of all crashes, up to 99% of LT related crashes
- ✓ Nearside signal head: 7% reduction in all crashes



Credit: OR22 and Mission St in Salem OR, taken with Google Maps. Picture showing nearside signal head and a signal head for each lane.

Helpful Resources

- ✓ FHWA *Toolbox of Countermeasures and Their Potential Effectiveness for Intersection Crashes* 2009 http://safety.fhwa.dot.gov/intersection/resources/fhwasa10005/docs/brief_8.pdf
- ✓ Crash Modification Clearinghouse Website <http://www.cmfclearinghouse.org/>
- ✓ *Highway Safety Manual*, 2010