

MEMORANDUM

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CDOT's Methodology for Preparing the Colorado Construction Cost Index (CCI)

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Fixed weighting factors have historically been used in computing the Colorado Construction Cost Index (CCI). These weighting factors represent the quantity levels of each sub group in a pre-determined time period called the base period. One of the limitations of this approach is that it usually overstates the impact of price increases and understates the impact of price decreases as the current period moves further away from the base period. To solve this problem, the base period is reset from time to time. For the Colorado CCI, the base period was usually reset every 10 to 15 years. The last reset was in 1987, 25 years ago.

In the July/August 2011 issue of Public Roads, Karen White and Ralph Erickson from FHWA published an article, "New Cost Estimating Tool", introducing the new National Highway Construction Cost Index (NHCCI). The new methodology adopts the Fisher Ideal Index, which takes the weights of both the base period and the current period into account. By doing so, Fisher Ideal Index has the ability to accommodate the effects of substitutions. In other words, the effects of changes in pay items and in quantities in a sub group are considered as they happen, instead of doing a major reset once every several years. In addition, a statistics-based method was adopted to remove outliers, those data points that fall outside of the 5th and 95th percentile of a given sub group by using the preceding 7-year data for any given quarter.

EEMA has carefully studied FHWA's new methodology and believed this is a major improvement in calculating the CCI.

Currently, the NHCCI is a composite index calculated by using all "qualified" items, while in Colorado we have been using the major sub groups of items to construct the composite index from the very beginning. EEMA considers this approach to be valuable so we continued this tradition. Composite index is constructed based on the weighted average prices and quantities of sub groups.

Sub groups are reduced to 5 from 6, with the Structural Steel group dropped. The weight of Structural Steel in the annual cost is less than 1% in recent years, down significantly from near 10% about 50 years ago. For the existing groups, namely, Earthwork, Hot Mix Asphalt, Concrete Pavement, Structural Concrete, and Reinforcing Steel, pay items used in the calculations are adjusted as pay items are added and deleted as technology and specifications change with time.

The new method calculates relative changes between two neighboring quarters. The cumulative changes between any given two quarters are calculated by multiplying all the successive relative changes in between.

For convenience, not as a “base period”, the composite index for the 1st quarter of 2012 was set to 1.0000. For the purpose of continuity, for those users who use multi-quarter moving average, the previous quarterly data points are provided all the way back to the 1st quarter of 2009. These data were calculated from previously published results by using the old way of calculating the CCI, but rebased to 1st quarter 2012 as 1.0000.

It should be noted that the new way of preparing the Colorado CCI does not solve the problem of fluctuations caused by other factors. Unusual variations in the index may occur due to the wide differences in climate, terrain, and working conditions within the state. So the index must be used with caution.