A Comparison of Burning Indexes Using Two Methods of Indicator Stick Exposure

In 1957 the Nelson Forest District adopted the Model 8 Burning Index Meter developed by the Intermountain Forest and Range Experiment Station for use in the Northern Rocky Mountain zone. The Model 8 meter is dependent primarily on readings obtained from one-half-inch fuel moisture indicator sticks modified by the current relative humidity and wind. Indicator stick readings are used in two ways to compute the B.I. (burning index). The five-day total of 1600 hour fuel moisture is used to compute a severity index which is, in actuality, a parameter of the large fuel moisture content, whereas the current 1600 hour reading is used as a parameter of the fine fuel moisture content.

The Model 8 meter was adopted to use $\frac{1}{2}$-inch ponderosa pine sapwood dowels weighing 100 grams, O.D. weight. The indicator sticks were to be placed in full sunlight on wire racks 12 inches above a bed of pine needles. A standard simulated canopy was provided by one sheet of 1/16-inch-mesh window screen supported about 4 inches above the sticks.

The B. C. Forest Service has traditionally used indicator sticks of Douglas fir sapwood. In 1956, the first year of testing, the sticks were exposed to full sunlight without the use of the screen. In 1957, when the index was termed operational in the Nelson District, the prescribed method of exposure was used at most of the fire weather stations.

During the summer of 1961, the differences in moisture content of Douglas fir sticks exposed under the screens and without the screens, were tested. The B. I. was also determined using fuel moisture contents determined by each method.

From a total of 40 daily weighings during the season it was determined that the screened sticks had a mean moisture content of 8.4%

while the adjacent unscreened sticks had a mean moisture content of 7.9%. The half per cent difference was quite consistent. The maximum difference of 2.6% occurred only once, the next largest difference of 1.2% also occurring once. Only once was no difference recorded. Invariably, the largest differences occurred immediately after rain. At no time did the unscreened sticks contain more moisture than the screened sticks.

As would be expected, the mean difference in five-day totals was in the neighbourhood of 2.5%. The maximum difference in five-day total was 6% which occurred once after a prolonged wet spell, while the minimum difference of 1.6% occurred once. These differences caused a change of severity index class 11 times during the season although the change was never more than one class. Daily B.I. were computed using the same relative humidity at zero wind. A change in B.I. was caused 18 times out of 40, the largest change being 6 units. (The Model 8 meter uses a hundred-unit scale.)

Conclusion

Although the lack of a screen does introduce some small errors, these errors allow a safety margin since the B.I., computed using unscreened stick weights, are either the same or higher than the index obtained using the screened sticks. Generally, it was noted that the difference in the daily weight, the five-day total and the final index computed from screened and unscreened parameters varied inversely as the burning index.

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