

## THREE YEARS' PERFORMANCE OF THE K/G BLADE IN SITE PREPARATION

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For the past three years, the Blandin Paper Company has carried out a number of site preparation projects involving the use of a K/G blade (fig. 1). The main features of this blade are the sharp angled cutting edge and the stinger or sharp projection used for ripping trees too large to be cut by the movement of the angle blade alone.

Although we have a K/G blade for our company D-4C caterpillar, most of our projects have involved the use of contract equipment, and to date we have been limited to the D-7 and D-7E caterpillar. Areas with trees under 8 inches d.b.h. can be sheared with the D-4C and K/G blade but at a slower rate than with larger equipment.

In operation the vegetation is sheared off at ground level as the "cat" makes long straight passes. Each time, a strip varying up to 11 feet in width is cut off. Theoretically, motion is continuous, but pile-ups generally occur and the equipment proceeds in a sequence of cutting, pushing material clear of the blade, and then cutting again. Most material up to 10 to 12 inches in diameter can be sheared without stopping (depending upon species, soil, etc.), but trees larger than this must be split and cut. This takes about four passes, each involving no more than 30 seconds of time. Piling or windrowing can be done either with the K/G blade or with a straight dozer blade. The intervals between windrows vary, depending on the capacity of the equipment or amount of vegetation to be pushed together. With the D-7 we generally find the interval to be about 165 feet. Typical windrows will average 15 to 20 feet in width and 5 to 10 feet in height. Generally, there is not a great deal of soil in the windrows compared to conventional land clearing where roots are pushed out.

The extent of clearing accomplished by the operation of the K/G blade alone or in conjunction with some other blade in windrowing is generally more than sufficient to make planting quite easy.

To date we have completed 10 projects involving 564 acres. Another 175 acres has been cut but not windrowed.

Most of our efforts have been directed toward converting residual stands of unmerchantable trees and brush left after cutting, or mixed northern hardwood stands (primarily sugar maple saplings) with little or no commercial potential. We treat primarily those areas that have suitable soil and moisture conditions for planting spruce.

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Many factors influence the costs of clearing and windrowing with the K/G blade. Obviously there are situations where machines of a particular horsepower rating are most economical to use. Whether machines are contracted or owned may affect the rate charged per hour of operation. The time of the year affects the ease of shearing and varies with species according to their root-holding capacity. Topography, number and soundness of stumps, and weight of materials to be cut and piled have significant effects on costs. In most cases shearing and windrowing has been applied to areas which are difficult or impossible to convert by other methods. Thus, we need machines in the D-7 or D-8 power range. We have been moving large amounts of vegetation under difficult situations.

The weighted average costs on completed projects is \$18.32 per acre for shearing and \$11.29 per acre for windrowing (table 1). No adjustment is made in these figures for acreage in windrows because I feel that modification of the planting pattern can give full utilization of the total area.

In some cases we have burned windrows at an additional cost of between \$5 and \$8 per acre. This may be higher than necessary. Recent experience shows good results with summer burning, a lesson we have learned from the prescribed-burn people. Burned windrows are easily planted by hand, and the effects of more shade and potash seem to make a significant difference in favor of this area for newly planted spruce.

From our experiences to date we would recommend that shearing be done prior to spring breakup, and windrowing be done during the following summer. This schedule provides for better visibility to the machine operator, less uprooting of trees with increased loads of roots and dirt to be moved, and allows the cut material to dry out before windrowing.

For the most efficient layout of sheared areas we have generally cut parallel to the long axis of the tract. This is an advantage in machine planting. In windrowing, the operator may deviate from this pattern by pushing cut material into wet or nonproductive type edges where this is convenient.

In logging operations on areas to be sheared we insist on low stumps. If possible, recently cut areas should be avoided in favor of areas on which the stumps have had time to deteriorate.

Vegetative regrowth on our sheared areas is predominantly annual weeds'. Where aspen has been winter sheared, sprouting is fairly heavy. These areas are generally patchy and are quite easily sprayed with a mist blower. Other hardwoods do not seem to sprout vigorously. Spruce transplants seem to benefit from the shading effects of the regrowth, and survival has been excellent on the sheared areas. It appears that plantations on sheared sites will be easy to establish and maintain.

Several years ago we disced a few small areas after shearing at a cost of approximately \$10 per acre. General observations of planted trees indicate a better height growth than on undisced areas. At present we do not contemplate discing of sheared areas as a general practice although this is commonly done in the South.



Fig. 1.--Diesel tractor with K/G blade clearing aspen stand to prepare site for planting spruce, Itasca County, Minn. (Photo supplied by M. J. Latimer.)

Some direct seeding plots have been put in on sheared areas. Results have been variable. Conditions ideal for germination of spruce seed are also ideal for annual weeds. Best results have been obtained with jack pine, red pine, and black spruce. I doubt very much, however, that a forester will go to the expense of clearing land and then trust to direct seeding to reforest it.

At the risk of getting into an economic justification of this type of site preparation I will mention that we have found a \$5 to \$8 per acre saving in planting costs. We guess that there may be a saving of \$5 to \$10 per acre on future release costs, depending upon the site cleared and whether you are planting spruce or pine. We do know that we can plant in fairly straight rows on prepared areas, and this may be of some economic benefit at a future harvest date. It is our belief that we can save some money on the cost of planting stock because of better survival and the need for fewer

trees per acre in the original planting. Having gained complete control of the site we anticipate that the succeeding crop will be easier to establish and will not require the drastic measures needed to establish the first one.

When all arguments are finished, we find that we do have a method of site preparation which is very well adapted to solving some of our difficult conversion problems. The test of its economic merits will come with time.

Table 1.--Blandin Paper Company K/G Site Preparation Projects 1960-63

Proj. no. :	Date :	Site conditions :	Acres :	Equipment used :	Cost per acre :
33	Aug-Sept 1960	Scattered merch. aspen and dense unmerch. hdwds.	93	Shear D7 & K/G Windrow D7 & Bulldozer TOTAL	\$20.84 <u>11.83</u> \$32.67
36	Sept 1960	Cutover aspen and jack pine	25	Shear D7 & K/G Windrow D7 & Bulldozer TOTAL	14.00 <u>9.90</u> \$23.90
58	July 1961	Cutover aspen and brush	63	Shear D7 & K/G Windrow D7 & Bulldozer TOTAL	11.55 <u>15.20</u> \$26.75
59	Aug 1961	Unmerch. hdwds. and brush	84	Shear D7 & K/G Windrow D7 & Bulldozer TOTAL	15.50 <u>13.85</u> \$29.35
60	Oct 1961	Cutover aspen	18	Shear D7 & K/G Windrow D7 & " TOTAL	13.60 <u>14.40</u> \$28.00
64	Mar 1962	Cutover aspen	36	Shear D4 & K/G Windrow D4 & " TOTAL	15.55 <u>9.91</u> \$25.46
83	Nov 1962	Unmerch. hdwds, scattered aspen and brush	175	Shear D7 & K/G Windrow D7 & " TOTAL	21.87 <u>8.70</u> \$30.57
93	Oct 1962	Cutover aspen	28	Shear D7E & K/G Windrow D7E & " TOTAL	20.00 <u>15.72</u> \$35.72
94	Jan 1963	Low density non-merch. hdwds and aspen	7	Shear D4 & K/G Windrow D4 & " TOTAL	12.96 <u>9.64</u> \$22.60
114	Mar 1963	Cutover aspen	35	Shear D7 & K/G Windrow D7 & " TOTAL	21.00 <u>7.50</u> \$28.50
All	1960-1963	Several typical	564	WEIGHTED AVERAGE: Shearing Windrowing TOTAL	 18.32 <u>11.29</u> \$29.61