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Roadside Fire Prevention Signs--- Standard and New Designs Compared

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ABSTRACT: The impact and recall value of a set of regularly used U.S. Forest Service fire prevention signs were compared with that of a set of improvised signs by interviews with typical forest users. The improvised signs generated a substantially greater impact. Although the regular signs have had past exposure to the general public, they demonstrated no significant difference from the experimental signs in the test of recall.

In the broad fire prevention program using many means of mass communication, the purpose of fire prevention signing has become distinct. Long, complex, or emotional messages seem best suited for radio, TV, magazine, or newspaper presentation; their target group is the entire population at the time of exposure. A roadside fire prevention sign, though, must influence specific travellers by an almost fleeting exposure. Its message must be brief, and it must compete successfully with other signs and a variety of other distractions. Thus, the specific purposes of forest roadside signs seem to be twofold. They should alert forest users to particular hazardous environmental situations, and they should remind forest users of the total fire prevention message made familiar through other media. Therefore, the "cuing" to other prevention efforts is probably the major function for this type of signing.

The present Forest Service fire prevention signs were not designed for this function. They are characterized by uniform size, shape, and color. Their messages frequently include long involved phrases. They are not distinguished from all other U. S. Forest Service information signs. For example, such signs as "Danger High Voltage" or "Truck Crossing" are also the same size, shape, and color.

Would new signs impress passing motorists more effectively? Would periodic modifications of design and content improve effectiveness, or would signs of good basic design be of long lasting value? The study reported here represents the first of a series which is being conducted to help answer such questions. The work is being carried out cooperatively with the California Department of Conservation, Division of Forestry.

METHODS

The specific aim of this study was to determine the difference in responses of typical forest users to a set of regularly used Forest Service fire prevention signs and a set of improvised signs in terms of impact and recall value. By impact we mean the attention-attracting quality of a sign, and by recall the quality of a sign which results in its message being remembered. We believe that these qualities are present to some degree in all signs and are related to the effectiveness of signs.

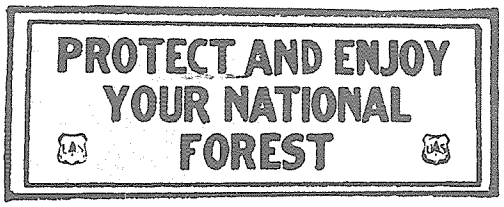
The study took place at the Butte Meadows Fire Station, Lassen National Forest, over a 28-day period. The experimental area was selected because of its traffic flow, its accessibility and adaptibility for field work, and its traditional forest road environment. We tried to interview all drivers from 7:00 a. m. to 7:00 p. m. Although a few vehicles were not stopped in this time period, 1, 197 drivers were interviewed. All vehicles were marked with bumper tape to guard against repeat interviews.

Along the 5-mile stretch of county road from State Highway 32 turnoff to Butte Meadows, 5 regularly used signs (fig. 1) were alternated daily with 5 improvised signs (fig. 2). The sign positions were placed approximately 1 mile apart on the county road. Individual signs in each set were rotated among the different sign positions in such a manner as to cancel out any location advantages or disadvantages. The forest public's reaction to the roadside signing was obtained by stopping vehicles at the Butte Meadows station and asking for answers to a short questionnaire.

RESULTS

Before comparing responses to the two sets of signs, it was necessary to show that persons exposed to one set did not differ in any other respect from those exposed to the second set. A Chi-square test showed no significant differences between the two groups, using the following variables available from the questionnaire data: "number of times driving the road this year," "number of years driving this road," "smoker-non-smoker," "place of residence," "age," and "sex."

While the set of regular signs was displayed, 30 percent of the drivers said they had noticed no signs along the test segment of road. In contrast, while the experimental signs were displayed, only 15 percent failed to notice any signs (table 1). This would seem to indicate that the new signs had greater impact value than the old. When asked about the general subject of displayed signs, drivers who had been exposed to the new signs were more inclined to report fire prevention or something related. Those exposed to the old signs had a higher proportion reporting unrelated subjects. This further demonstrates a greater impact value of the new signs, as well as the relative recall value for the two sign sets.



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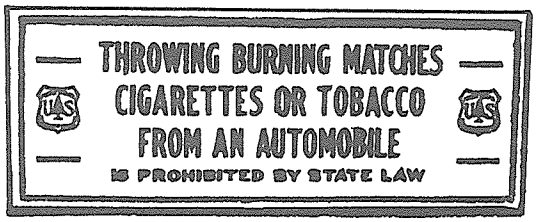

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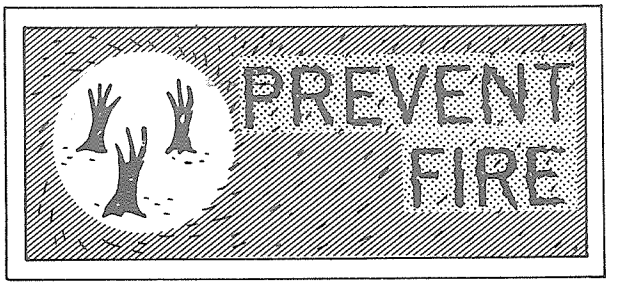
Figure 1.--The signs used in the experimental area consisted of 5 regularly posted signs: 17 inches by 44 inches, black lettering, and yellow background.



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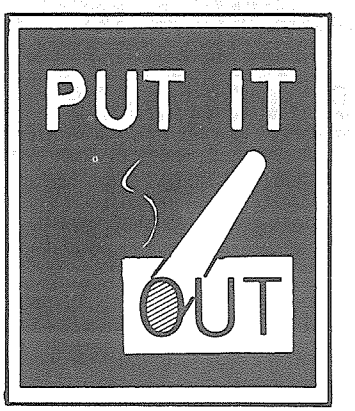

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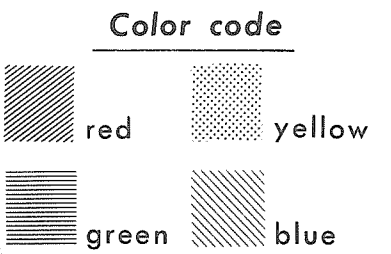

Figure 2.--Five new signs were improvised by the Station staff. Sign 2 represents variability in color and symbolism. Sign 6 is similar to several used in the 'Smokey Bear' promotion. It was reduced in size so as to possess an area relative to the regular Forest Service signs. The background color (green) and the less detailed 'Smokey Bear' picture were also variations. Signs 4, 8, and 10 represent variability in shape, color, verbal message, and symbolism. Size was relative to the regular issue signs.

The drivers were then reminded that several signs dealing with fire prevention were displayed (up to this point in the interview there had been no intimation that fire prevention was the subject of the study). They were asked to recall the one sign that stood out in their minds. The results (table 2) reveal that much of the differential in impact value of the two sets of signs is due to signs 4 and 8, particularly the latter. Sign 1, of the old set, also made a rather strong impression.

Forest users have had ample opportunity over the years to become familiar with the old signs. This familiarity would distort the impact value of the signs as it was here measured. Of the drivers queried while the old signs were displayed, 14 percent mentioned signs that were not displayed at any time during the study. Also, more than twice as many (44.2 percent in contrast to 18.6 percent) were unable to recall any sign as outstanding.

To get some measure of the recall value of the various signs, drivers were asked to describe the sign they considered outstanding. It was presumed that the greater familiarity through repeated exposure to the old signs over the years would give drivers exposed to these signs an advantage in replying to this question. Contrary to expectations, there was no significant difference between the two sets of signs (table 3). Lack of significance would appear to reflect favorably on the new signs.

The differences among the individual signs were in the expected direction (i.e., those which measured highest on their impact value also tended to rate highest on recall), but these differences were not large enough to be statistically significant. This lack of differentiation may indicate a flaw in the measurement procedure rather than a representation of the actual situation. Each driver was responding to a sign he had previously recalled as "outstanding." Also, a fairly large share of the drivers, especially among those exposed to the old signs, had not been able to select an outstanding sign. Consequently, they were not included in this step of the analysis.

In another measure of recall, the drivers were shown a card containing color reproductions of all signs used in the study. They were asked to point out the signs displayed in the test area. On the average, those who were exposed to the new signs recalled 2.4 signs. Those exposed to the old set averaged only 1.5 signs, and more than one-fifth of them said they had seen none of the signs (table 4). In contrast, less than 5 percent of those exposed to the new signs failed to see any of them.

The individual signs maintained essentially the same ranking as was demonstrated on the other measures, signs 8 and 4 of the new signs and 1 of the old signs being the most frequently mentioned (table 4). All of the new signs except number 6 had a level of recall as high as, or higher than, any of the old signs.

A few persons reported seeing signs not displayed at the time. Some of these may have been passengers rather than drivers on days when the signs were displayed. Therefore, they were previously exposed to the interview and possibly victims of suggestibility.

Responses to all questions were analyzed in terms of the following individual characteristics: age, sex, smoker-non-smoker, place of residence, and familiarity with the road. The only significant relationship showed that experimental signs had a greater impact on persons in the "45-54 year" age group than on those in the "over 64 year" age group.

DISCUSSION

This study compared regularly used and experimental signs in terms of their ability to (a) attract the attention of motorists on forest roads and (b) cause the motorists to remember the message. These two characteristics were considered important, but not the only, qualities of an effective sign. The new signs were approximately the same size as the old but different in shape, color and wording, and in the use of symbols.

In general, the set of new signs did show up better. The reasons for their superiority were not determined in the study, but the signs in both sets that proved most effective had short verbal messages (2 to 3 words) in contrast to the longer messages (4 to 14 words) in all of the less effective signs. Length of message, though, is only one factor. All but one of the new signs had similar short messages, but they differed markedly in effectiveness. No doubt, color, design, and novelty, for example, were also important factors. Only further experiments will reveal the ways in which each contributes to a sign's effectiveness. Some effects may be due to complex interaction between factors. Such interaction may prove too subtle and complicated for objective analysis. Ultimately, we may be obliged to rely upon a pragmatic test which shows one sign to be effective and another ineffective without being able to explain precisely why.

The Authors. . .

are studying ways to aid the prevention of man-caused fires, with headquarters in Berkeley.
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Table 1. *Proportion of respondents reporting having seen signs, and subject matter of signs observed, Butte Meadows road, July-August 1964*[1]

Response	New signs displayed[2] (n = 628)	Old signs displayed[2] (n = 569)
	Percent	
Signs noticed		
Subject matter of signs[3]		
Fire prevention	41.7	29.3
Fire prevention and others	26.3	19.5
Other	13.5	19.3
Do not recall	1.4	2.2
Unreported	1.7	--
Total	84.6	70.3
No signs noticed	15.4	29.7

[1]Responses to interview questions: After you turned off State Highway 32 on your drive up here today, did you notice any signs along this road? If yes, what were these signs concerned with?

[2]There was a significant difference between groups of respondents in the number of signs noticed. $X^2 = 24.75$, sig..005, df = 1.

[3]There was a significant difference between groups in the subject matter of signs. $X^2 = 53.58$, sig. .005, df = 3.

Table 2. *Proportion of respondents reporting specific signs as outstanding, Butte Meadows road, July-August 1964*[1]

Response	New signs displayed (n = 628)	Old signs displayed (n = 569)
	Percent	
New signs[2]		
No. 2	5.1	--
No. 4	16.4	--
No. 6	4.0	--
No. 8	45.3	--
No. 10	4.9	--
Total	75.7	--
Old signs[2]		
No. 1	--	12.6
No. 3	--	4.2
No. 5	--	6.0
No. 7	--	8.6
No. 9	--	10.2
Total	--	41.6
Sign not displayed	5.7	14.2
Do not remember[3]	18.6	44.2

[1]Responses to interview question 3: You may recall that there were several signs dealing with fire prevention. When you think back, which one sign stands out in your mind?

[2]There was a significant difference between individual signs in the experimental set. $X^2 = 100^+$, sig. .005, df = 4. There was a significant difference between individual signs in the regularly used sign set $X2 = 31.84$, sig. .005; df = 4.

[3]There was significant difference between the number of respondents who did not remember any signs. $X2 = 100^+$, sig. .005, df = 1.

Table 3. *Respondents recall of message of signs considered outstanding, Butte Meadows-road, July-August 1964*[1]

Signs	Total selected signs	Complete recall	Substantial recall	Little or no recall	No answer or do not know	Total
	Number	*Percent*				
New signs:[2]						
No. 2	32	28.1	43.8	25.0	3.1	100.0
No. 4	103	28.1	39.8	24.3	7.8	100.0
No. 6	25	8.0	52.0	36.0	4.0	100.0
No. 8	284	37.3	40.8	16.9	5.0	100.0
No. 10	31	9.7	45.2	41.9	3.2	100.0
Total[3]	--	31.4 (N=149)	41.7 (N=198)	21.7 (N=103)	5.2 (N=25)	100.0 (N=475)
Old signs:[2]						
No. 1	68	47.2	36.1	12.5	4.2	100.0
No. 3	25	12.5	37.5	41.7	8.3	100.0
No. 5	35	14.7	38.2	35.3	11.8	100.0
No. 7	50	30.6	34.7	24.5	10.2	100.0
No. 9	58	31.0	39.7	20.7	8.6	100.0
Total[3]	--	31.7 (N=74)	37.1 (N=88)	23.2 (N=55)	8.0 (N=19)	100.0 (N=236)

[1]Responses to interview question no. 4: What did this sign say specifically? Analysis confined to those recalling a sign considered outstanding.

[2]There appears to be no significant difference between individual signs within either set, but because of the small number of respondents in each group the accuracy of the chi-square test can be questioned.

[3]There was no significant differences between levels of recall for the experimental sign set (taken as a whole) and the regularly-used sign set. $X2 = 2.52$, $df = 3$.

Table 4. *Proportion of respondents reporting having seen specific signs, Butte Meadows road, July-August 1964*[1]

Response	New signs displayed (n =628)	Old signs displayed (n = 569)
	Percent	
New signs[2]		
No. 2	41.7	1.2
No. 4	58.6	1.2
No. 6	28.7	4.2
No. 8	76.8	1.6
No. 10	37.7	1.2
Old signs[2]		
No. 1	1.6	37.1
No. 3	.5	30.9
No. 5	.3	25.5
No. 7	.2	29.5
No. 9	.0	27.2
None of these	4.6	21.3

[1]Responses to interview question 5: Several of these signs were displayed on this road today. Will you please tell me which ones you are sure you actually saw?

[2]There was a significant difference between individual signs in the experimental sign set. $X^2 = 100.+$, sig. =.005, $df = 4$. There was a significant difference between individual signs $X^2 = 21.44$, sig. .005, $df = 4$ in the regularly used sign set.