Evaluation of Black Rubber-Plastic Strip Holders for Flight Progress Boards

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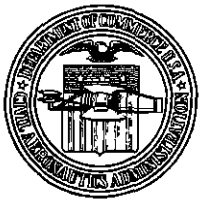
TECHNICAL DEVELOPMENT REPORT NO. 285



CIVIL AERONAUTICS ADMINISTRATION
TECHNICAL DEVELOPMENT CENTER
INDIANAPOLIS, INDIANA

August 1958

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CIVIL AERONAUTICS ADMINISTRATION
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EVALUATION OF BLACK RUBBER-PLASTIC STRIP HOLDERS FOR FLIGHT PROGRESS BOARDS*

SUMMARY

This report covers an evaluation of a black rubber-plastic strip holder for flight progress boards which was conducted by the Technical Development Center and the Indianapolis Air Route Traffic Control Center of the Civil Aeronautics Administration at the request of its Office of Federal Airways Two hundred of these strip holders were furnished from the El Paso Air Route Traffic Control Center for a 30-day evaluation test At the end of the test period, a subjective-opinion questionnaire was circulated among Indianapolis Center personnel It was agreed generally that the black rubber-plastic strip holders reduced greatly the noise associated with the handling of standard metal strip holders at the flight progress boards, there was less abrasion on the fingers when working with the rubber-plastic strip holders, and the black rubber strip holders reflected less glare than the metal strip holders currently in use The flexibility of the rubber strip holder did not prove bothersome to the majority of the personnel The black rubber holders slide down steep-angle boards under their own weight On the low-angle "Pittsburgh-type" board, however, it generally was necessary to pull the strip holders back into position manually after they were displaced The contrast between the black color of strip holders and the neutral color of the paper strip was found objectionable by some personnel

Although Indianapolis Center personnel liked the black rubber-plastic strip holders better than either of the two types of gray rubber-plastic strip holders previously tested, they were not ready to recommend that they be adopted on a national basis

It is recommended, therefore, that further work be done to develop a more acceptable strip holder to replace the metal holders now used

INTRODUCTION

The noise caused by use of metal strip holders in Air Route Traffic Control (ARTC) Centers has been an undesirable factor ever since the first installation of flight progress boards With the increase in the number of sectors and in numbers of working personnel, and with the addition of other noise-making equipment such as teletypewriters and radio and intercommunication loud speakers, the noise level in the Centers has reached disturbing proportions

Bell Telephone Laboratories (BTL), under CAA-Western Electric Company Contract Cca-29804, undertook to analyze the noise-making factors in ARTC Centers This study[1] indicated that a large amount of undesirable noise was caused by the impact of metal flight progress strip holders The noise produced is a high-frequency sound which carries long distances in the Center quarters The BTL report recommended that one of the first steps to decrease the noise level in Centers should be to use some material other than metal in strip holders A black rubber-plastic strip holder was developed and furnished to the El Paso Center for testing Subsequently, the CAA procured two types of gray rubber-plastic strip holders which were tested in the Indianapolis ARTC Center Since the gray rubber-plastic strip holders had been tried in an in-service test at Indianapolis, the Office of Federal Airways arranged for the El Paso Center to furnish the Indianapolis Center with 200 of the black rubber-plastic holders for a comparative evaluation This report covers the tests of the black rubber-plastic strip holders in the Indianapolis Center

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*Reprinted for general distribution from a limited distribution report dated April 1956

[1] Bell Telephone Laboratories, Final Progress Report - Task 4, Part 1, "Noise Study of CAA Air Route Traffic Control Centers," October 31, 1954

TEST

The black rubber-plastic strip holders were used daily in the Indianapolis ARTC Center for a period of 30 days beginning December 20, 1955 During the first half of the test period, these strip holders were used on the IA-1 Type flight progress board. This board supports the strip holders at an angle of 55° from the horizontal During the second half of the test period, the strip holders were used on the standard Pittsburgh-type boards On these boards the strip holders are supported on rods at 30° from the horizontal

Because of the fact that only 200 black rubber-plastic strip holders were made available for this test, intermixing of metal and rubber holders was a common occurrence This probably accounted for some of the unfavorable criticism of the rubber-plastic strip holders Although an effort was made to retain the strip holders being tested on one sector, each day's operations caused some of the strips to be widely scattered throughout the Center Personnel were instructed to gather the rubber-plastic strip holders onto one sector during the midnight shift

Near the end of the test period, control personnel in the Indianapolis ARTC Center were requested to complete a subjective-opinion questionnaire Forty-six persons, or about 78 per cent of the Center's operating personnel with enough experience to evaluate Center working equipment, responded to this survey request

A copy of the questionnaire follows, with the answers indicated as a percentage of the total answers received

"EVALUATION QUESTIONNAIRE - BLACK RUBBER STRIP HOLDERS

"A study which was made to determine the cause of noise in ARTC Centers indicated that a high percentage of undesirable sound is caused by the metal strip holders on the flight progress boards In an effort to reduce the noise level, strip holders of different materials are being tested, including a black rubber-plastic material The El Paso Center was completely equipped with the black rubber-plastic strip holders about two years ago and has recommended that they be adopted on a national basis The Indianapolis Center has been requested to evaluate these strip holders since it also tried thegray rubber holders Please give your individual impressions on the questionnaire

		YES (per cent)	NO (per cent)	NO ANSWER (per cent)
1	Do the black rubber strip holders decrease the noise level?	93	4	2
2	Does the paper strip move about in the black rubber strip holders more than in a metal strip holder?	17	83	
3	Is the black rubber strip holder flexible to the point of being bothersome when writing on the strip?	30	70	
4	Have you noticed less abrasion on the finger tips when lifting the rubber strip holders on the flight progress boards?	63	35	2
5	Do the rubber strip holders slide down the rods without difficulty under their own weight?	41	50	9
6	Do the black rubber strip holders retain their shape satisfactorily?	43	48	9
7	Is there less glare from the rubber strip holders?	74	24	2
8	Have you noticed any eyestrain from using the black rubber strip holders?	37	61	2

		YES (per cent)	NO (per cent)	NO ANSWER (per cent)
9	Have you noticed any other effect on your eyes? If so, what?	33	56	11
10	Would you prefer that the strip holders be some color other than black? If yes, please indicate preferred color	48	39	13
11	Do you feel that the black rubber strip holders are superior to the gray rubber strip holders tried previously?	41	41	17
12	The black rubber strip holder is EASIER HARDER SAME to lift on the board than metal strip holders (Check one)	EASIER 22	HARDER 56	SAME 22
13	The black rubber strip holder is EASIER HARDER SAME to load than the metal holder (Check one)	44	28	28
14	The black rubber strip holder is EASIER HARDER SAME to unload than the metal holder (Check one)	28	28	44
15	Would you like the black rubber strip holders better if it was not necessary to use them with metal holders on the same board?	65	30	4
16	Would you have liked them better if the Center had been completely equipped with the black rubber strip holders?	50	37	13
17	Do you feel that the reduction of noise by using rubber strip holders as compared to the standard metal strip holders outweighs any disadvantages noted?	26	67	7
18	Would you recommend that the black rubber strip holders be adopted to replace the metal strip holders on a national basis?	30	67	2
19	What would you suggest to improve the rubber strip holders?			
20	List below any other comments			

"Please return this questionnaire to the Watch Supervisor by January 23, 1956 "

On Question 9, personnel commented that there was too much contrast between the black strip holders and the neutral colors of the flight progress boards and the paper strips

In answer to Question 10, the colors recommended were

Color	Number Voting for	Color	Number Voting for
Green	5	Buff	3
Light gray	5	Light blue	3
Brown	3	Any neutral or lighter color	6

On the IA-1 (55°) boards, considerable difficulty has been experienced with the regular metal strip holders tumbling from the board No improvement in this respect was noted with the rubber-plastic strip holders, in fact, the tumbling tendency seemed to increase when the rubber and metal holders were intermixed

The rubber-plastic strip holders did not slide on the supporting rods of the Pittsburgh-type (30°) flight progress frames as readily as do the metal strip holders On these boards the rubber holders generally did not slide down the rods under their own weight but had to be pulled into position manually On both types of boards, the black rubber-plastic strip holders frequently would stick more on one end than on the other, causing the holders to slide into an oblique position with further binding, and requiring manual readjustment During the test no special maintenance, such as polishing or lubricating the rods on which the strip holders slide, was performed on the flight progress boards Such maintenance might reduce some of the sliding difficulties

The rubber-plastic strip holders were slightly thicker than the metal holders This slight increase in thickness tended to hide letters and numbers written along the lower edge of the paper strips in metal holders immediately above a rubber-plastic strip holder This difference in thickness also resulted in personnel occasionally catching a thumb or finger on a rubber-plastic holder when strip holders were intermixed On the high-angle board, this caused the strip holder to tilt and fall from the board and sometimes caused other holders to tumble from the board

CONCLUSIONS

The black rubber-plastic strip holders appear to have the following advantages as compared to the standard metal strip holders

1 They eliminate the noise produced by metal holders
2 They are less abrasive on finger tips
3 They produce less glare from reflections

The following disadvantages were noted

1 They do not slide down the rods adequately under their own weight
2 There is too much contrast between the black color and the paper strips used

Although the black rubber-plastic strip holders are not as rigid mechanically as the metal strip holders, they seemed to be satisfactory in this respect during this 30-day test period

In general, the Indianapolis ARTC Center personnel did not recommend that these strip holders be adopted as a standard for use in ARTC Centers

USCOMM-DC-54,990