SELECTION OF ASBESTOS FIBER AND ASPHALT CONTENTS

FOR

BRIDGE DECK PAVEMENTS

Report R 72-5

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VERMONT DEPARTMENT OF HIGHWAYS

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Report Prepared by

Bituminous Concrete Section

Introduction

At the direction of Assistant Chief Engineer E. H. Stickney, an investigation was conducted for the puspose of designing a standard Vermont Type IV bituminous concrete pavement with asbestos fibers. Studies by others have shown that the use of asbestos fibers in bituminous pavements have permitted the use of higher asphalt contents with a resulting reduction in air voids. A reduction in air voids should produce a more impervious mix than obtained normally.

Asbestos Fibers have been used successfully by other States in bituminous pavements for approximately 12 years. Studies indicate that pavement flushing and shoving is not a problem when high asphalt contents are used with asbestos fibers.

Procedure

Aggregates were selected from the plant that will supply the mix to the first project in Vermont to Utilize this technique. The asbestos fibers meet the contract specifications for Canadian Mining Grade 7M.

A standard Mashall series was run for each asbestos fiber content of 1%, 1½% and 2%. These fiber contents were selected because of conversation with neighboring States who have tried this item. The Marshall series was run varying the asphalt content from 6% to 9% in ½% increments. A total of 14 briquetts were made for each series.

The results for each series were computed on standard Marshall sheets, and then transferred onto Figures 1 through 7. For brevity, only the Figures are included in this report.

Discussion

(1) Selection of Asbestos Fiber Percentage

From Figures 4 and 5, an asbestos fiber percentage of 1½% is more advantageous at any asphalt content relative to a minimum of air voids (% density) and the maximum weight per cubic foot. Figure 6 indicates that the curves are similar for either 1% or 1½% asbestos, with both reducing quite rapidly. The 2% asbestos doesn't

have much initial stability and begins to loose after 8% asphalt content. Figure 7 shows flow increasing for all fiber contents, but at the upper asphalt contents, the 1½% appears to be increasing at the slowest rate.

From all the above, it appears that 1½% is the better choice of the three fiber contents tested.

(2) Selection of Asphalt Cement Content

From Figure 5 it appears that an asphalt content of between 8% and 8.5% will give the least amount of air voids for the 1½% fiber content already selected above. Inspection of the other three graphs indicates less desirable characteristics at 8.5% than at 8% asphalt. It is, therefore, concluded that 8% asphalt is the proper content to select in this case.

Recommendations

It is recommended for this aggregate that the fiber content be 1½% and the asphalt content be 8% for the base course on bridge decks.

BY RH Sacco DATE 5/9/72 SUBJECT Asbestos Fiber Bridge Deck Mix 1% Fibers SHEET NO. 1 OF 3

CHKD. BY ____ DATE ____ JOB NO. ____

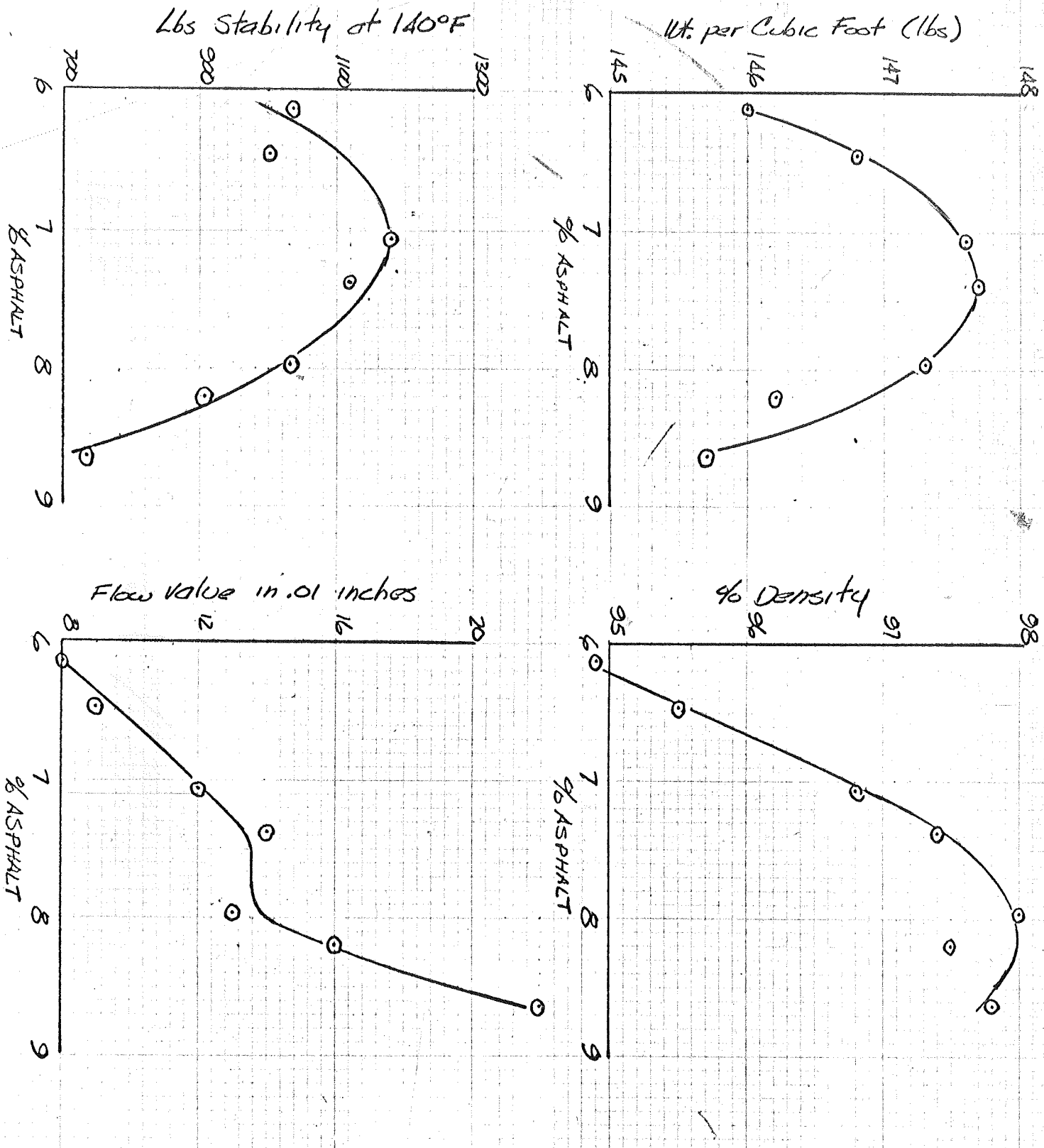
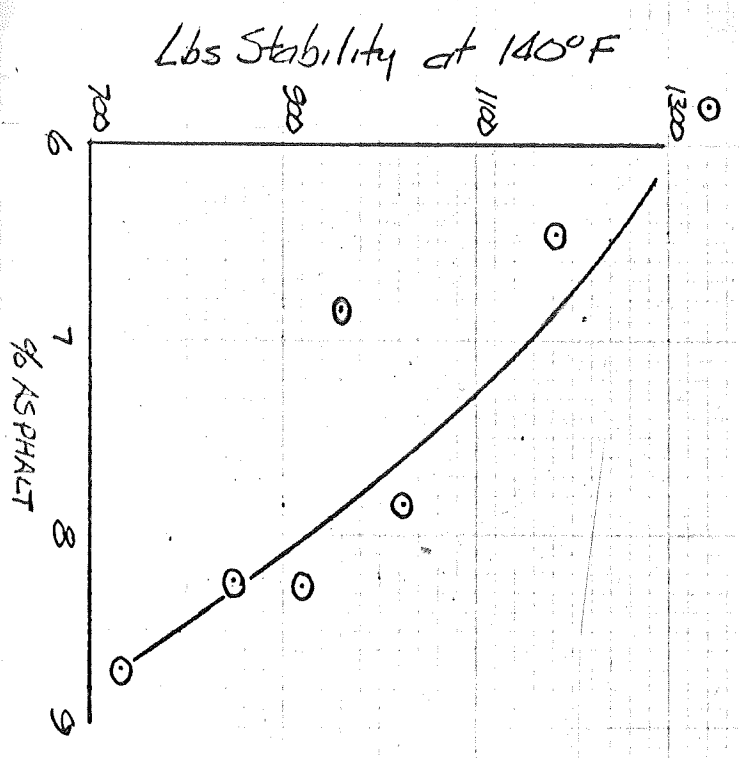
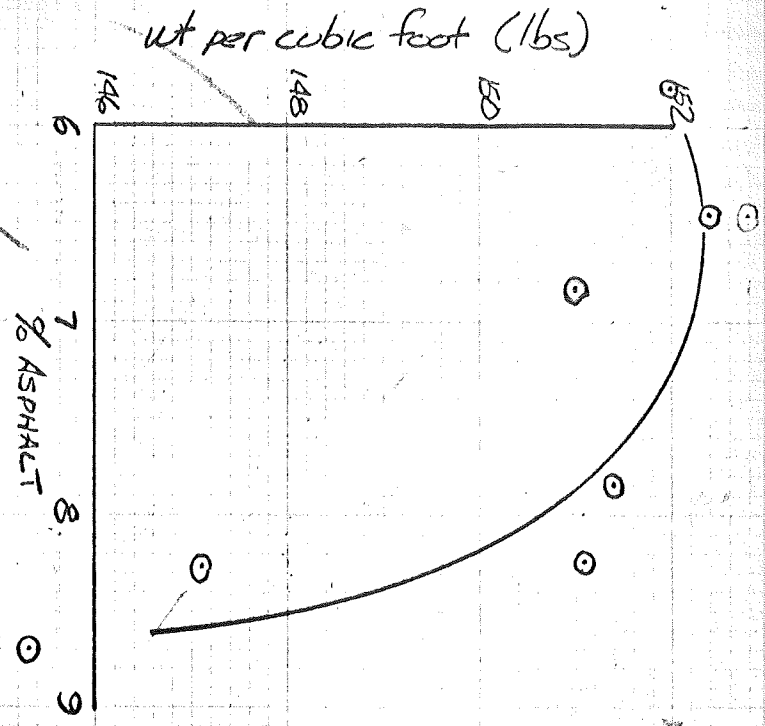


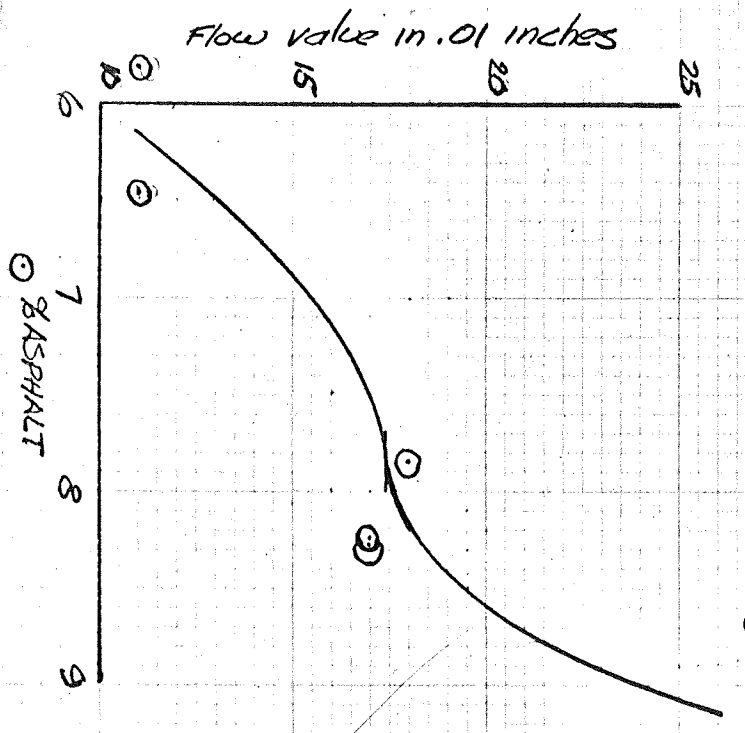
FIGURE 1

BY PHS DATE 5/9/72 SUBJECT ASBESTOS FIBER BRIDGE DECK MIX 1½ % Fibers SHEET NO. 2 OF

CHKD. BY DATE JOB NO.







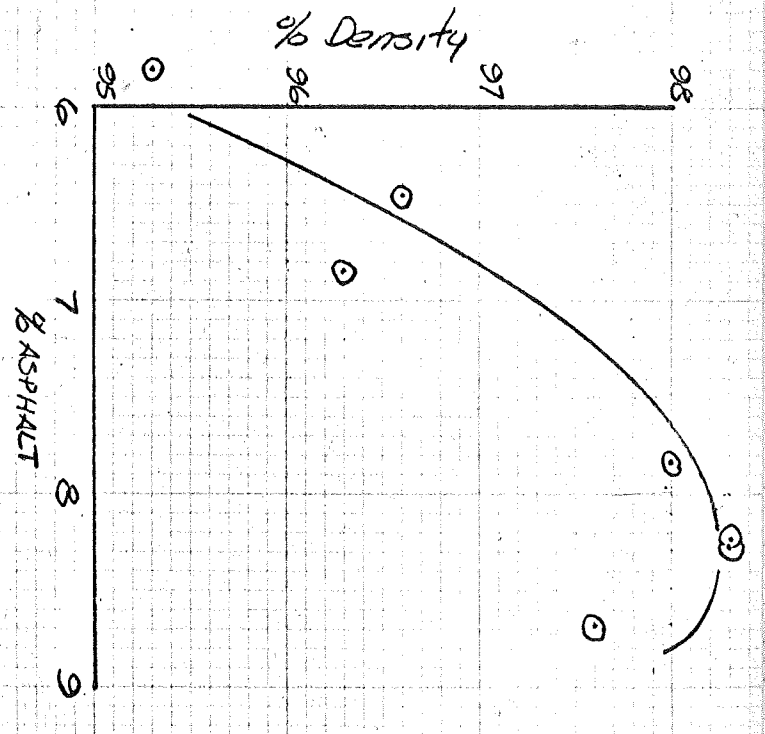


FIGURE 2

BY R H Sneed DATE 5/9/72 SUBJECT Asbestos Fibers SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ Bridge Deck Mix JOB NO. ____

2% Fibers

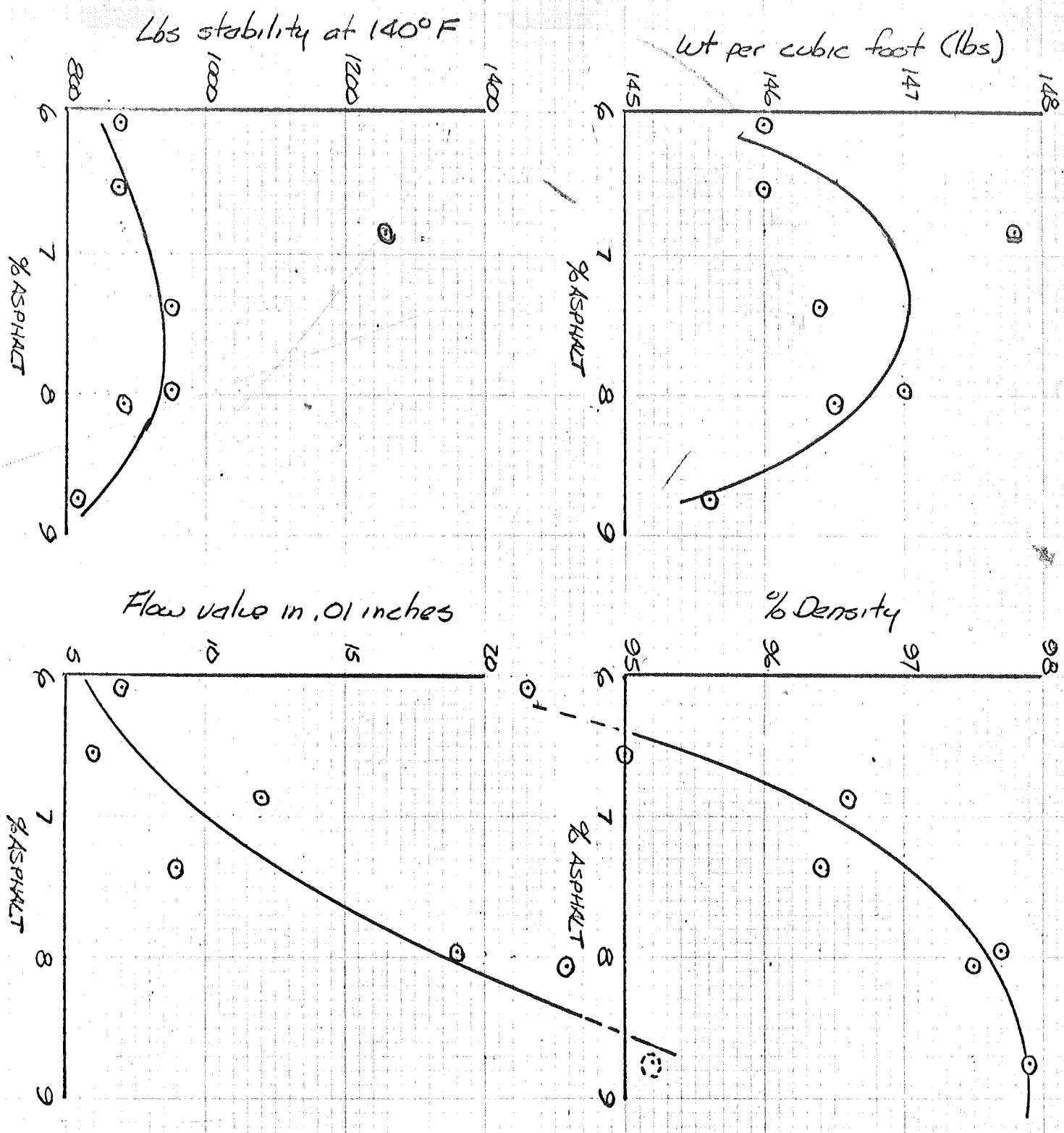


FIGURE 3

BY R H Snow DATE 5/9/72 SUBJECT Asbestos Fibers Bridge Deck Mix Ac. vs wt. per cu. ft. SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

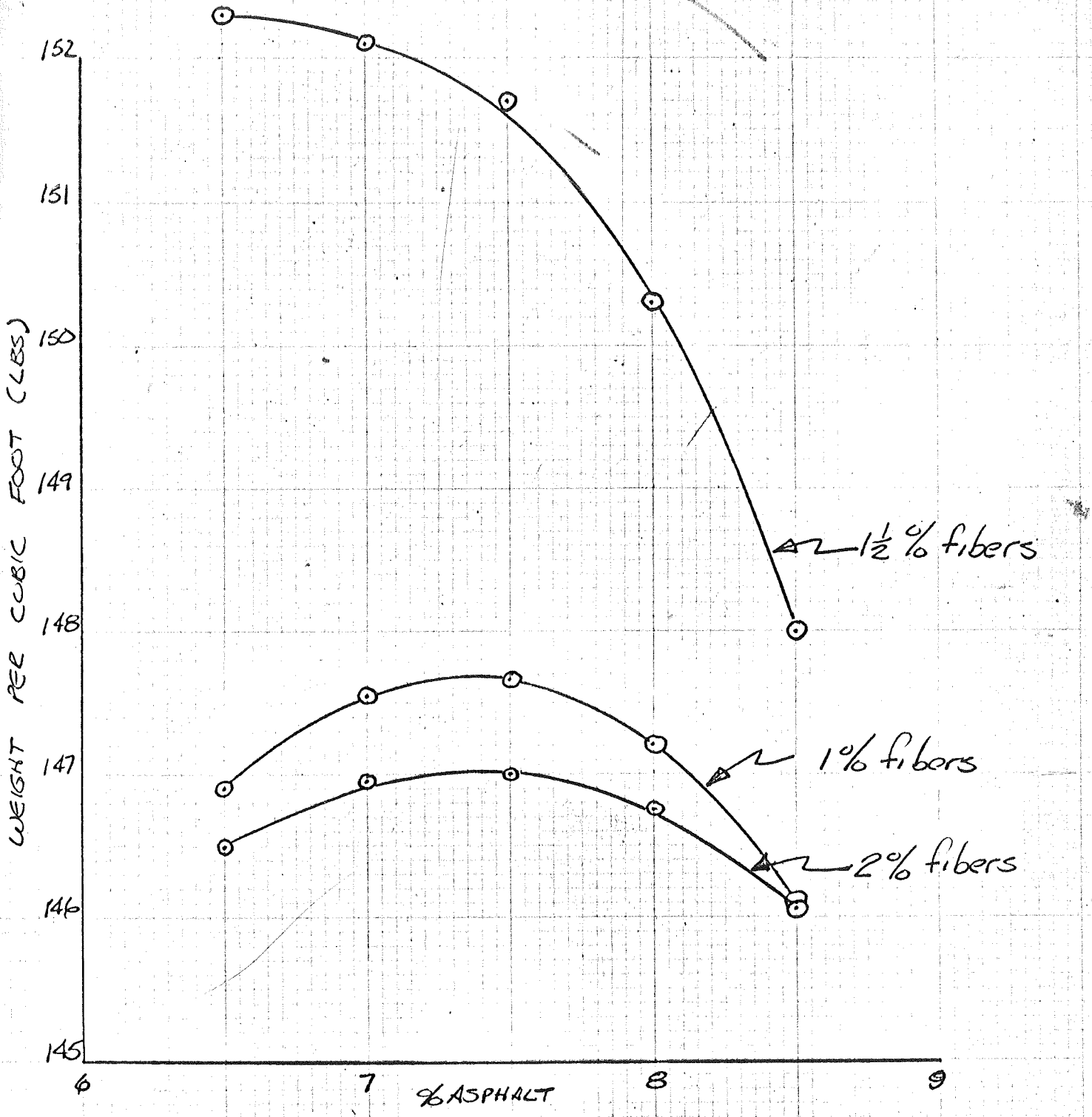


FIGURE 4

BY R.H. Simms DATE 5/9/72 SUBJECT Asbestos Fibers Bridge Deck Mix Ac vs % Density SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

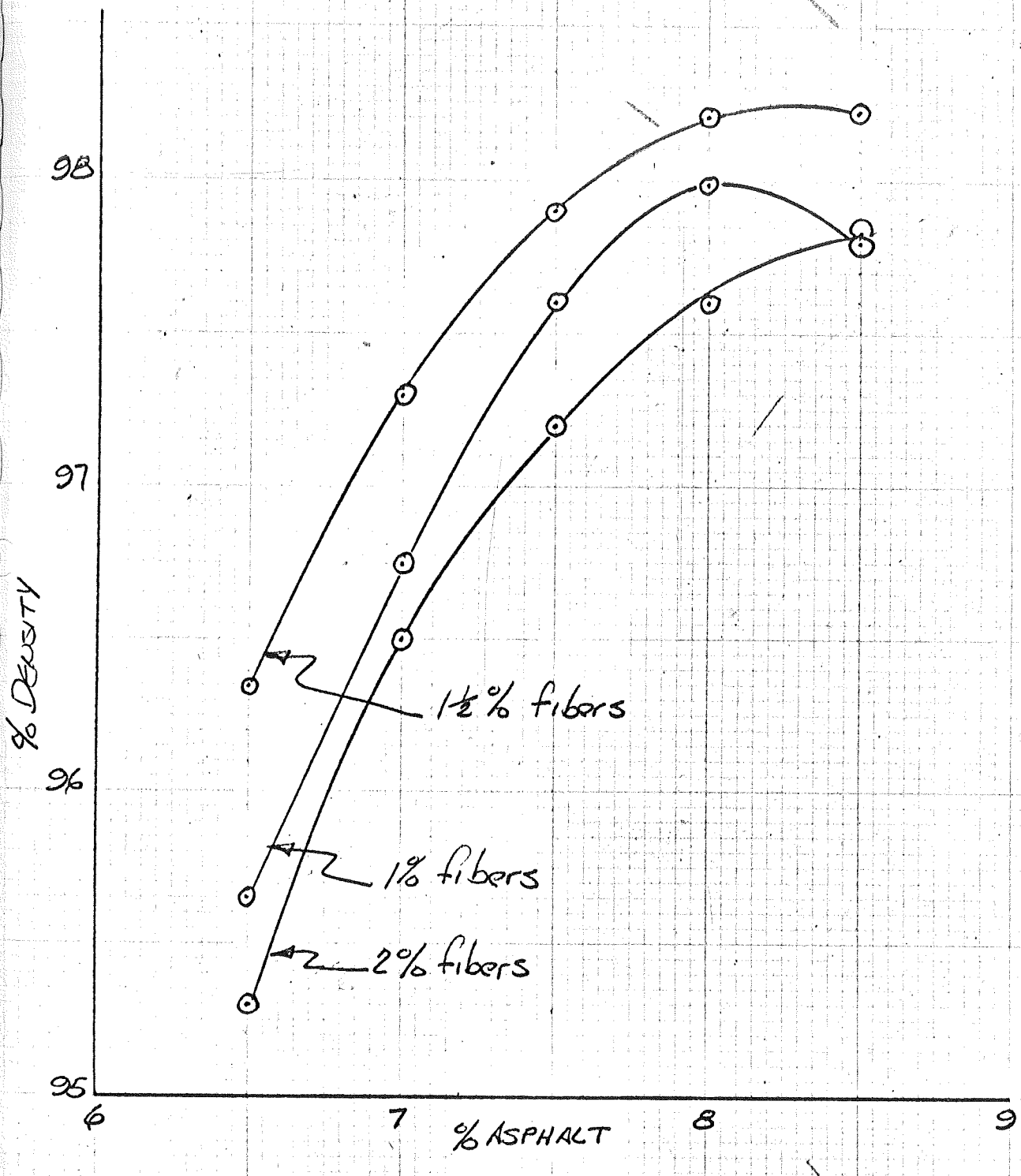


FIGURE 5

BY R N Snow DATE 5/9/72 SUBJECT Asbestos Fibers SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ Bridge Deck Mix JOB NO. ____

Ac vs lbs stability at 140°F

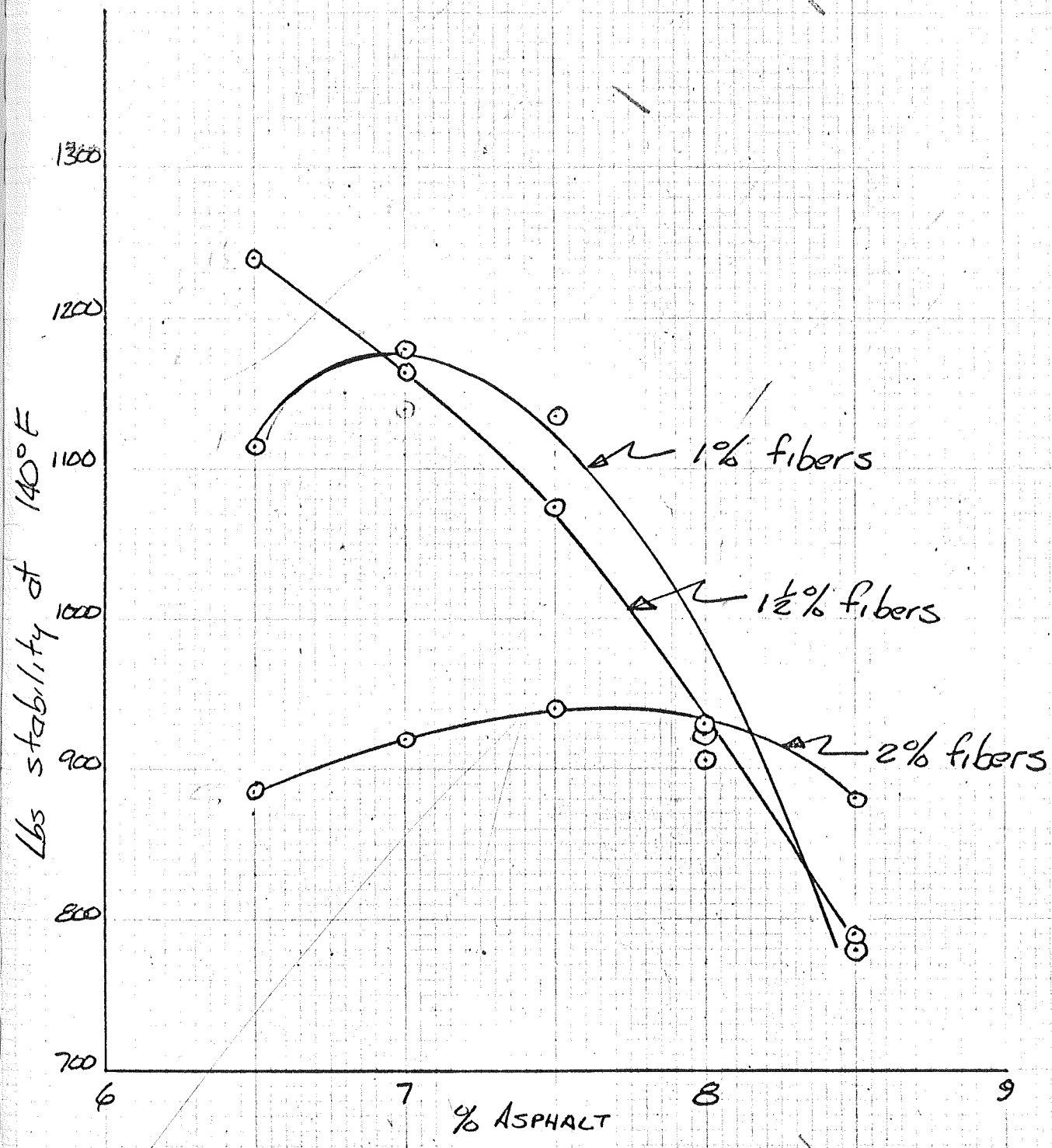


FIGURE 6

BY RH Snow DATE 5/9/72 SUBJECT Asbestos Fibers Bridge Deck Mix Ac. vs Flow value in .01 inches SHEET NO. ____ OF ____

CHKD. BY ____ DATE ____ JOB NO. ____

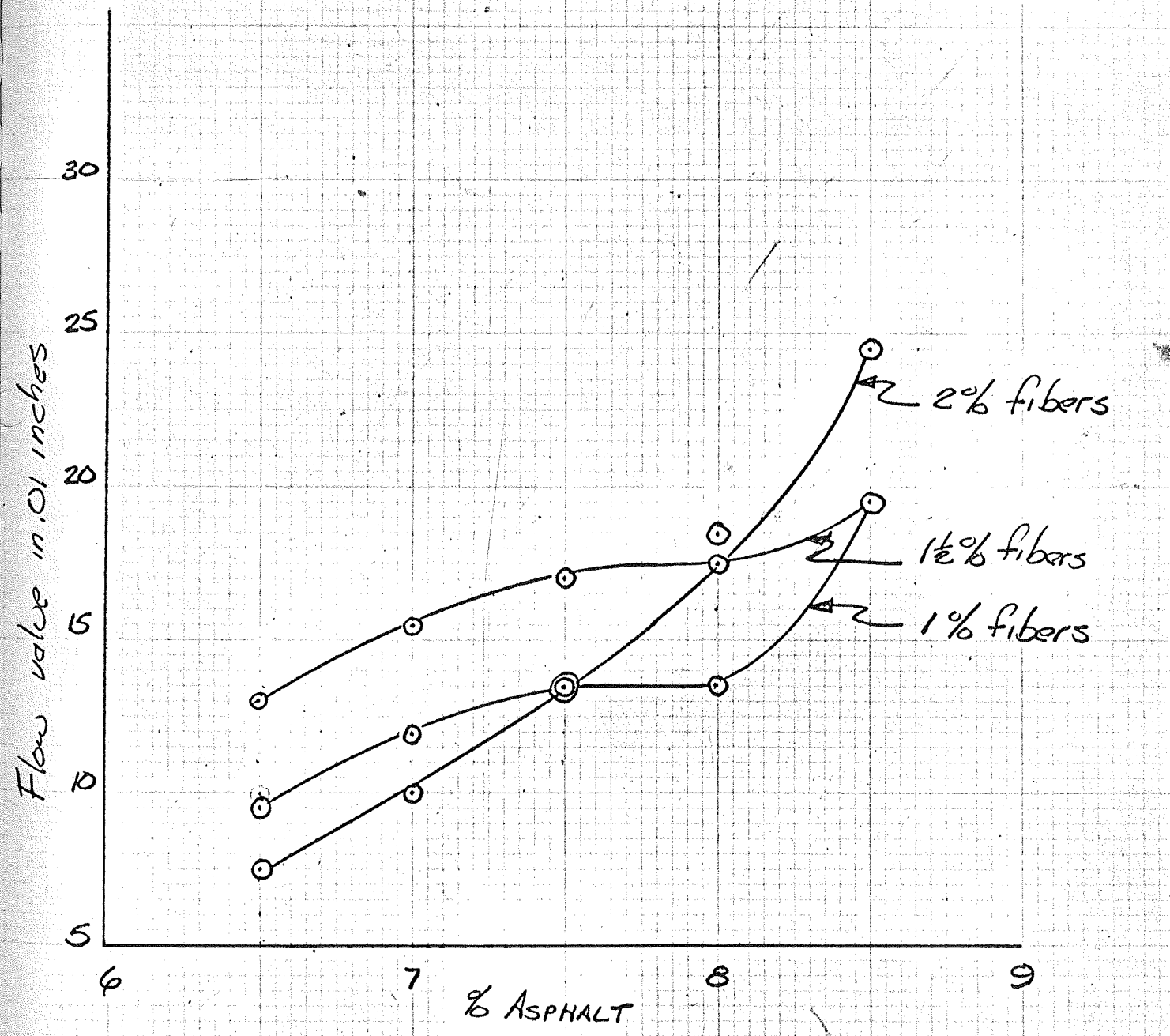


FIGURE 7