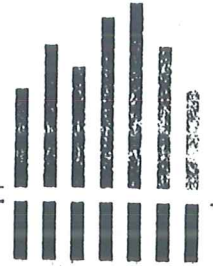


File VI - 0106

CONSTRUCTION ENVIRONMENT, INC.



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March 17, 1983

#72

Reasonable Doubt?

Ms. Sissi Maleki
Research Associate
Reader's Digest
Pleasantville, NY 10570

Reference: Examination of a portion of concrete curb kept at the National Archives, Washington, D. C.

Dear Ms. Maleki:

On March 10, 1983, the undersigned conducted a visual examination of a portion of concrete curb at the National Archives in Washington, D. C. The specimen was kept in a padded wooden box and was made available for examination by Mr. Marion Johnson of the Judicial, Fiscal and Social Branch. The purpose of the examination was to look for external signs which might indicate that the concrete curb had been patched.

The section of concrete curb was approximately 12 in. long and was generally gray in color. There were several marks of higher color along the vertical face of the curb; those marks could have been caused by wheels of vehicles parking too close to the curb or by construction equipment during removal of the section of curb. The scratch marks were not considered significant relative to the purpose of the examination.

At the center of the concrete curb section, on the vertical face just below the curbed transition between the horizontal and vertical surfaces, there was a dark gray spot. The dark spot had fairly well-defined boundaries, so that it stood out visually from the surrounding concrete surface. The spot was roughly ellipsoidal in shape, approximately 1/2 in. by 3/4 in. in principal dimensions.

The surfaces of the curb which would normally have been exposed in service were visually examined with the aid of a 10X illuminated magnifier, with special attention given to the dark spot. It is significant to note that no other areas of any size were found anywhere on these surfaces with characteristics similar to those of the dark spot. These characteristics are described below.

The most obvious characteristic of the dark spot was the difference in color. The boundaries of the darker area were as well defined under the 10X magnifier as they were to the unaided eye. It is considered probable that the difference in color is due to the cement paste; however, the possibility of a surface-induced stain cannot be ruled out.

Another difference was noted in the color of the sand grains. The sand grains in the surrounding concrete surface were predominantly semi-translucent light gray in color, but there was also a significant amount of light brown sand grains. The dark spot contained only semi-translucent light gray sand grains. It is possible that the difference in sand color may be due to a different kind of concrete; i.e., a patch, existing in the dark spot area. However, given the ratio of light gray sand grains to light brown sand grains in the surrounding concrete surface, and the relatively small size of the dark spot area, it is also possible that the difference in color of sand grains may be explained in terms of the statistical variations in the distribution of sand grains throughout the concrete mass.

The upper edge of the dark spot appeared to show marks of some sand grains having been dislodged along the boundary between the dark spot and the surrounding concrete area. This is consistent with the relatively weaker zones that normally occur in the thin, or "feathered", edges of a surface patch. Again, however, the dislodgement of sand grains could be due to other causes.

In summary, the dark spot shows visual characteristics which are significantly different from those of the surrounding concrete surface. While any one of the differences, by itself, could be easily explained in terms other than a patch, the simultaneous occurrence of those differences would amount to a rather curious coincidence of characteristics. But the existence of a surface patch would also be consistent with and explain all of the observed differences.

While the results of this visual examination must necessarily be considered inconclusive, it would certainly appear that further investigation is warranted. Since the methods of investigation must be strictly non-destructive in nature, it is recommended that a more detailed visual examination, using techniques of microscopic petrography, be conducted to gain more conclusive information regarding the cement paste, the sand grains and the surface coloration.

If there are any questions with regard to this report or if we can be of further service to you in any way, please do not hesitate to contact us.

Very truly yours,

CONSTRUCTION ENVIRONMENT, INC.



Jose I. Fernandez, P.E.
Chief Engineer

JIF/vdd