

A SAMPLING INSPECTION PLAN FOR CONTINUOUS PRODUCTION¹

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I. INTRODUCTION

1. Purpose. This paper presents a plan of sampling inspection for a product consisting of individual units (parts, subassemblies, finished articles, etc.) manufactured in quantity by an essentially continuous process.

The plan, applicable only to characteristics subject to nondestructive inspection on a Go-NoGo basis, is intended primarily for use in process inspection of parts or final inspection of finished articles within a manufacturing plant, where it is desired to have assurance that the percentage of defective units in accepted product will be held down to some prescribed low figure. It differs from others which have been published^{2,3} in that it presumes a *continuous flow of consecutive articles* or *consecutive lots* of articles offered to the inspector for acceptance in the order of their production. It is accordingly of particular interest for products manufactured by conveyor or other straight line continuous processes.

In operation, the plan provides a corrective inspection, serving as a partial screen for defective⁴ units. Normally, a chosen percentage or fraction f of the units are inspected, but when a defective unit is disclosed by the inspection it is required that an additional number of units be inspected, the additional number depending on how many more defective units are found. The result of such inspections is to remove some of the defective units, and the poorer the quality submitted to the inspector, as measured in terms of per cent defective, the greater will be the corrective or screening effect. The object of the plan is the same as that incorporated in some of the sampling tables already published⁵, namely, to establish a limiting value of "average outgoing quality" expressed in per cent

¹ Presented at the Joint Meeting of the American Society of Mechanical Engineers and the Institute of Mathematical Statistics, May 29, 1943, by H. F. Dodge, Quality Results Engineer, Bell Telephone Laboratories, New York.

² H. F. Dodge and H. G. Romig, "Single Sampling and Double Sampling Inspection Tables", *Bell Sys. Tech. Jour.*, Vol. XX (1941) pp. 1-61. An unpublished paper by Prof. Walter Bartky (developed when he was associated with the Western Electric Co., 1927) provides a continuous multiple sampling plan involving two factors— f , as used here, and i , the number of units in a "compensating sample" required to be inspected for each defective unit found.

³ Lt. R. J. Saunders, "Standardized Inspection", *Army Ordnance*, Vol. XXIV (1943) pp. 290-292; G. Rupert Gause, "Quality Through Inspection", *Army Ordnance*, Vol. XXIV (1943) pp. 117-120.

⁴ A unit of product that fails to meet the requirement for a characteristic is classed as nonconforming with respect to that characteristic, and for convenience is referred to as "defective". Thus, a deviation from a specified requirement or from accepted standards of good workmanship is termed a "defect"

⁵ H. F. Dodge and H. G. Romig, *loc. cit.*