

CORRESPONDENCE

on a Paper published in
Proceedings, June 1957

Works Construction Paper No. 35

The employment of contractors' plant on civil engineering
construction works†

by

R. H. McGibbon and J. H. Brass, M.I.C.E.

Correspondence

Mr J. W. Lowdon (formerly Chief Engineer, Kuwait Oil Company) said he agreed with the Authors' opinion that the provision of adequate yard and repair-shop facilities was a first priority if maximum usage of machines was to be obtained. At the same time, there were one or two features of the shops themselves which might have been otherwise arranged with advantage. In the first place, in the case of a medium-sized depot such as that described, he doubted the wisdom of having two spans when that could be avoided. Much better usage could be obtained from the overhead cranes provided in one span than from the same number of cranes spread over two or more spans. If one was of heavy and the others of medium capacity, work fluctuated to such a degree that it was not always possible to restrict activity in a span with a medium-capacity crane to light machines, so that work might have to be carried out with inadequate cranes, or machines transferred from one bay to another. Even when transfer rails were provided, as shown in Fig. 23, the latter procedure was inconvenient and time wasting.

228. Mr Lowdon considered that activities definitely not requiring height, e.g., offices, tool and small part stores, injector rooms and the like, should not be housed under the main spans, but in lean-to bays, so that the height of the building (which although not so expensive as its other dimensions, still represented an appreciable cost) should not be wasted. In any case double-storey treatment had disadvantages. The arrangement was not particularly cheap, and, subconsciously perhaps, men would always avoid climbing stairs if they could.

229. In the main building he considered it preferable that the various areas or shops should not be divided by walls, but by light open expanded-metal or similar partitions, or even by handrails only. That treatment permitted full overhead crane access, provided complete visibility, and allowed for the generally frequent changes in layout required with an absolute minimum of disturbance. Thick walls dividing shops restricted vision, increased the degree of supervision required, and involved major costs if changes had to be made. Those remarks were not, of course, intended to apply to cases such as engine-assembly shops, where solid partitions might be necessary to permit air-conditioning or plenum systems to exclude dust.

230. The height in the main shops was understood to be 20 ft only. That appeared insufficient to allow the larger types of excavator being dismantled by the overhead crane, and it would be of interest if the Authors could state whether difficulty was experienced in that respect.

† Proc. Instn Civ. Engrs, vol. 7, p. 209 (June 1957).

231. The Authors' description of the maintenance methods adopted was of the greatest interest. However, unless Mr Lowdon had misunderstood the nature of the system used, it appeared that it was not one of "Planned, Preventative Maintenance", but a procedure whereby defects were reported by site staff and depot inspectors as they occurred, that being continued until the reports made it evident that the machine should be returned to the shops.

232. In a substantial plant organization at one time under Mr Lowdon's control a fully planned maintenance system was in force, i.e., the staff responsible for the maintenance of each machine received from an independent planning staff precise instructions on the occasion when each routine was due of the exact details of the work which had to be done together with the man-hours involved, and any failure to comply with those instructions was treated as a major issue. Whilst he appreciated the difficulties of a contractor operating such a system he was of the opinion that in no class of machine did planned preventative maintenance show such dividends as in construction plant. It had been pointed out in the discussion that losses involved in the breakdown of plant because of the consequent stoppage of other activities was very great indeed. Surely then it was better for the machine to be shut down for a limited and known period of planned maintenance during which the utilization of the attendant labour could also be planned, rather than that it should be allowed to run on until breakdown occurred without warning, and alternative use for the labour could not be arranged? Once set up such a system did not require a very large staff to operate it. Detailed but quite simple returns were made at the time each routine was carried out, giving details of the condition found and the work actually done, so that the system automatically collected complete plant records, and at the same time rendered unnecessary many of the rather purposeless reports often prepared.

233. Mr Lowdon was somewhat surprised that neither the Authors nor those taking part in the discussion had raised the question of the desirability of greater standardization in the construction plant produced by British manufacturers. The aircraft industry, rightly or wrongly, was often blamed for attempting the production of too many types of machines; that criticism was valid in the case of construction plant. By standardization agreement between manufacturers and by action by individual firms, which often themselves produced an unnecessarily large range of sizes of the same piece of equipment, delivery periods could be shortened. Furthermore, when a buyer had a particularly urgent demand, it would be much more feasible for him to "jump the queue" by paying a premium for earlier delivery, as was common practice in the United States of America, because equipment being of a few standard varieties, the possibility of disturbance in subsequent deliveries would be lessened. As it was, under such circumstances, buyers with urgent requirements were forced to accept equipment not of their own standard and, if overseas work was concerned, often of other than British manufacture.

234. Overseas, the biggest single problem involved in keeping construction plant working efficiently and continuously was the maintaining of a sufficient stock of spare parts. That must be large enough to meet all ordinary demands but at the same time not so large that an inordinate amount of capital was locked up. The need to purchase a variety of equipment for the same purpose, which arose directly from long delivery periods and indirectly from non-standardization was a principal cause of such overstocking. A greater degree of standardization would pay appreciable dividends on that score alone.

235. Mr Stanier had mentioned the desirability of major overhauls being carried out by the makers, stating that that facility was not at present offered by British manufacturers. Whilst that might be true where the whole machine was concerned, it was not so in the case of engines. Several British Diesel engine makers were prepared either to overhaul customers' engines, or alternatively to supply new or reconditioned engines against the return of customers' engines. By taking advantage of such arrangements, and, where the number of machines justified it, holding a small float of engines, it was possible to reduce that side of the work of the depot to a minimum, and to obviate any possibility of machines being rendered idle through engine overhauls not having been completed.

The Authors, in reply, could find little to support the statement that better usage could be obtained from overhead cranes provided in one span than from the same number of cranes spread over two or more spans.

237. If similar shop areas were provided, a single-span building would be of inordinate length, since single spans greater than 50 ft involved a severe penalty in roofing and crane costs. Also site level problems would be more acute, and inter-departmental and external traffic routes doubled in length.

238. The Authors considered it highly desirable on first principles to keep the building to the most compact dimensions consistent with economical construction and operation.

239. They agreed that there were valid reasons for housing offices, stores, and such activities in lean-to attachments to the main spans. However, heavy parts and unit assemblies required handling, and considerable operational economy was achieved if that could be done by the shop cranes. If space in the main spans was thus set aside, the height of the building could be utilized to build on two floors, and it then became possible to house small-parts stores inside the workshop and convenient to all departments.

240. The height of the building illustrated was 22 ft to the underside of the crane waybeam; that height had been found adequate in practice.

241. With regard to maintenance the system of inspection the Authors described was used in addition to routine maintenance—which might, of course, be described as preventative maintenance, since all maintenance was preventative. The Authors hesitated to adopt the scheme described by Mr Lowdon as general practice on works in the United Kingdom.

242. However, on overseas work where operators and field fitters might to some extent, lack the traditional skills associated with the operation of plant, there undoubtedly existed a strong case for systematic shut-down maintenance, and the Authors were surprised to note that in that connexion Mr Lowdon had referred only to difficulties in maintaining adequate parts stocks.

243. The question of standardization was interesting, but the Authors considered that it was, by and large, best that the market should be governed by the laws of supply and demand.