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AIR TRANSPORT..

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Construction by helicopter

Although the armed services have contributed much to the development of the helicopter, and practical and reliable vehicles did not appear until the late 1940s, there has been
a steady increase in the number of commercial applications
for this type of Vtol transport. In this article RICHARD EVANS outlines the use of helicopters as skycranes in the United States and gives details of their operating costs.

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ARSON HELICOPTERS of Perkasie, Pennsylvania, specialises
in construction work and claims to have the largest fleet of heavy-lift helicopters with the greatest lifting capacity of any industrial operator in the United States. This company, which began business overhauling heli-copters for resale, entered the field of construction by helicopter during the 1960s with Sikorsky S-55s. These types, powered by radial piston engines, were capable of lifting up to 3,4001b and were used for building power lines through mountainous and swampy areas. The techniques which were developed had obvious economic implications for the civil engineer.
The problems of the construction industry often create new uses for the helicopter and one of its most common jobs has been the placing of air conditioners on the roofs of new supermarkets and shopping precincts. It has been found that the best place for such units, which weigh any-thing from 2,0001b to 12,0001b, is on the roof. As buildings have become larger their roofs have become weaker, and it is now virtually impossible to use a boom crane on major buildings. The expense and shortage of skilled labour is another reason why contractors are now more likely to turn to the helicopter. By speeding up each project it is possible for a contractor to do much more each year with fewer men, as the following example illustrates. A 25-ton crane with a 12-man crew can take up to 28 days to set a 12,0001b air conditioning unit in place. A Sikorsky Skycrane hauling directly from trucks recently set 14 such units (charged at $1,500 per unit) in place after four hours' fly-ing time during one working day with a 20-man crew. A helicopter capable of lifting 12,0001b is expensive to hire, but the final analysis shows its advantage:—

Crane Helicopter

Labour costs

Equipment costs

Totals

12 men x 8hr x
28 days at$7/hr
= $18,818 .
1 crane x 8hr x
28 days at$30/hr
= $6,720

$25,536

20 men x 8hr x
1 day at $7/hr
= $1,120
1 helicopter x 14
units at$1,500/unit
=$21,000

$22,120

While the helicopter saves $3,416, a more important advantage is, perhaps, the saving of 27 working days, releasing men for additional profitable work.
Loads for the helicopter are increasing, so it has been necessary to use more powerful machines. Carson redesigns certain systems on all its helicopters, however, and claims to achieve a 12-15 per cent reduction in empty weight, resulting in increases in payload of up to 20 per cent. Underneath each helicopter is an electrically operated hook to which a variety of cables, shackles and safety hooks may be attached, depending on the load.

Carson now owns most of the spares for the piston-engined S-58, which can lift 5,0001b, making it cheap to operate. The company has been experimenting with a turbine conversion which will give a payload and altitude performance comparable with that of the Westland Wessex. The top-line work horses of the fleet are the S-61L and R models (equivalent to the Westland Sea King). These have been approved by the FAA for external loads of 7,0001b and 7,4001b respectively. For very large loads Carson uses the Sikorsky Skycrane, for which it is a representative. This machine has a load capacity of 20,0001b.
To keep risks to a minimum, care must be taken in planning building projects in which a helicopter is to be used. Pre-job conferences are held between the parties concerned to determine how many men will be required on the ground. The helicopter pilot will decide the flight path to be used, and steps are taken to determine any-special safety precautions which may be required. Specific responsibility is placed for cleaning the entire area where the helicopter is to be used, as the downdraught and ground-effect turbulence are likely to disturb any loose materials. In hot and dusty conditions all working areas, including the load pick-up site, the flight path, emergency landing site and load drop site, must be sprayed with water. Each load to be lifted must be clearly marked with its weight and numbered in sequence. In the United States the local police and fire departments have to be notified. Ground crews must wear goggles, hard hats with chin-straps and rubber gloves as protection against the heli-copter's static electricity. As the pilot cannot see the load under the aircraft he has to rely on directions from pick-up and load-drop signal men. Ground men must never work under the load or turn their backs on it, as the pilot may jettison the load in an emergency.
Carson Helicopters points out that although the future of the helicopter looks very promising there are still limitations to its use. The company believes that the heli-copter will never replace the crane and other ground equipment on the average job. It is economic only if the job is a difficult one and cannot be handled easily by conventional equipment.