

Australia Takes A New Sight On Surveying

Nobody, says Australian surveyor Carel Hart, really likes walking.

And those who detest it more than most are surveyors — especially if they have the job of “staff-man”.

Which probably explains why Carel Hart, when faced with an assignment to contour survey 300,000 acres at 1 and 2 ft. intervals in Queensland, figured there must be an easier way.

“Tramping around all day lugging a 16 ft. pole and target,” he elaborates, “has never been my idea of fun.”

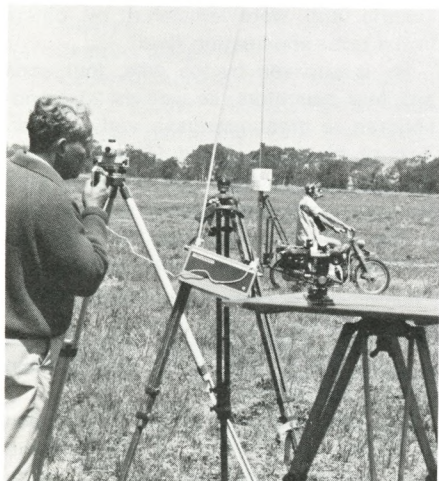
Carel Hart's solution was simple — a motor-cycle fitted with a frame to hold the staff in a vertical position; an odometer to measure distances at intervals of four feet; and a two-way radio walkie-talkie contact between surveyor and mobile staff-man.

Spectacular Results

The results, apart from the obvious saving on boot leather and blisters, are nothing less than spectacular.

With an assistant, he can now complete a one square-mile contour survey (of 1 ft. intervals) in less than six hours — a job that would normally take four days. “I was never able to understand,” he recalls, “why surveyors the world over used their legs instead of their brains. Maybe it is because we are basically a conservative lot, and old habits die hard.”

These days, in the rich crop growing district of the Darling Downs 100 miles west of Brisbane, the sight of Carel Hart's quaint machine bouncing across the fields with its survey staff whipping like a mast in a gale, is as familiar as a sheaf of wheat.



Carel Hart sights through an automatic level while Len Eacott moves off on the specially-fitted motor-cycle.



Hart, left, checks the odometer on the special motor-cycle before his assistant, Len Eacott, takes off on a survey run.

Behind its creation lies a story of one man's battle against the relentless forces of nature

Solve Flood Loss

Mr. Hart, a soil conservationist with the Queensland Department of Primary Industries, was given the task in 1966 of undertaking the first intricate (1 ft. to 2 ft.) contour survey of the Darling Downs' main growing area in an effort to find a method of conserving the enormous loss through floods each year of top soil.

His “territory” covered nearly 300,000 acres in a triangular area roughly 12 miles by 12 miles by 25 miles.

Almost every acre is planted with either wheat, barley, sorghum or maize.

The country is relatively flat and criss-crossed with streams and natural water-courses

Every year, during summer, heavy rains send tons of water spilling from the vast catchment areas of the Eastern Downs swirling and scouring out the soil.

Usually, when the first rains come, the rich black soil has dried hard and cracked open into a maze of fissures.

The flood rains soak quickly into the ground, the cracks close, and the soil becomes almost impervious.

Consequently, the water continues to stream across the ground and through the crops at great speed without having any further beneficial effect on the soil, and often with disastrous results to the standing crops.

Harness Water

It became obvious several years ago, that the answer was to find a way of “harnessing” the water so that it could be induced to flow at a slower rate.

To do this, an accurate, detailed topographical survey was necessary.

Until 1966, the only contour surveys had been done by photogrammetry at 10 ft. intervals.

In this kind of country, where even a slight fall in levels is vital to gauge water flow, these proved inadequate.

Carel Hart set about his task in the normal manner of surveyors the world over . . . walking, sighting, mapping, walking.

He soon realised, however, that unless he could find a quicker method, the job could take a lifetime.

That was when he hit upon the idea of the motor cycle.

“At first, everyone thought I was
(continued on page 32)

Australia Survey (continued from page 31)

crazy," he says.

"Like all simple idea, people are prone to be hypercritical."

His prototype was an old machine which bucked and spluttered its way across the vast open plains much to the merriment of local farmers.

Got Approval

Eventually, as Carel Hart and a lone assistant began eating up the survey miles at an unprecedented rate, officialdom had a closer look at his weird contraption.

"It took a lot of memo writing but eventually we obtained State Government approval to buy the right equipment," he said.

With a grant of \$A530 he bought an agricultural motor cycle, two transceivers, a home-made odometer (from aircraft parts) and a steel frame to support the detachable aluminium surveyor's staff.

The motor cycle is loaded into a bright yellow van (for better visibility) together with the usual survey equipment, and driven to the area under survey.

The survey staff is bolted on to a fixed rear frame section of the cycle and the level-man's table erected.

To enable the level-man to increase the range of his observations (up to a mile) a cylindrical 1 ft. wide orange and white blocked target is fixed to the staff in the required position.

Bright yellow vests for both rider and level-man further improve visibility.

How It Works

The rider, wearing headphones and carrying a small transceiver, moves off on a predetermined track.

The level-man keeps him on-line by sighting at the cylindrical target and "talking" his path by radio.



Hart takes sight through a telescopic alidade while Eacott moves away on his bike.

The rider comes to a halt on command, and sits straddling his machine while the staff remains in a vertical position and the level-man takes a reading.

The motor cycle has low and high gear ratios, and can cover almost any reasonable terrain including rocky creek beds and steep hills.

Unlike a truck, or four-wheel drive vehicle, the motor cycle does not damage crops.

Put Up Barriers

The major result of the contour surveys has been to show that the only way to slow the flow rate of flood water in the area, is to erect strategically placed barriers by strip cropping.

By this method of planting, crops provide a brake for the water, allowing it to flow slowly and giving the soil time to take a deeper soaking.

The 1 ft. contour survey maps are able to pinpoint precisely the direction and level of water flow, and so provide growers with a master plan for planting.

Most growers are now converting to strip cropping in symmetrical rows 1¼ chains wide.

The basic idea is that there will always be either standing crop, or crop stubble, in alternate strips so that the water can not build up too much speed.

Carel Hart says his mobile survey unit could be used to great advantage in countries with wide open plains, such as Canada, the United States and Russia.

He expects to complete his current contour assignment early this year.

Underground Services

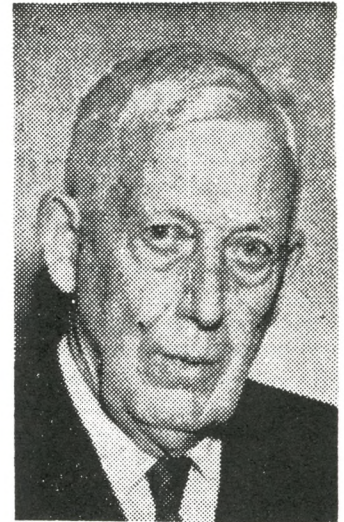
(continued from page 29)

and understood is that underground strata will become an increasingly important subject for surveys and plans, in somewhat the same way condominium has focused our attention on the idea of surveying spatial volumes.

The accompanying illustration (on page 30) at reduced scale is a plan of future underground services in the Charing Cross area of Glasgow made in connection with the Glasgow Inner Ring Road project. The layout is completely referenced to national grid co-ordinates. Plans of the area are marked with grid blocks so that any service can be accurately scaled and its co-ordinates interpolated. The grip block provides a ready made index system. The co-ordinates will ensure that the services can be located accurately and their position known at all times regardless of change to surface buildings and roadworks. Each service is further detailed on profile drawings recording the levels of the various mains.

The maintenance of records of buried services could be centralised at the municipal engineer's office in each in-

Veteran Surveyor Wm. G. McGeorge Dies In Accident



William G. McGeorge, 85, a Chatham land surveyor, and honorary vice-president of the Association, died May 18 in hospital after being struck by a truck while crossing a street.

Mr. McGeorge, a professional engineer, was instrumental in draining Kent County's marsh lands for conversion to some of Canada's richest farming land. He retired in 1968 after more than 50 years of elected service for the city of Chatham. He served without interruption on the municipal water board from 1922 until his retirement, and was chairman of the board for 27 of those 46 years. He also served previously on the board of education.

He served as engineer for both Dover and Chatham Townships for half a century and specialized in drainage schemes that turned soggy soil into top quality crop growing land. Many of his methods won him recognition across Ontario and were emulated by others in the rural engineering field.

He is survived by his wife, four sons and four daughters, as well as 20 grandchildren, a great grandson and a sister. Two of his sons, David G. and Donald D., both of Chatham, are Ontario land surveyors and professional engineers.

The late Mr. McGeorge had been an Ontario land surveyor since 1911.

corporated municipality or with each of a maximum of five or six names local service authorities.

The latter policy is generally practised in Britain and Europe at the moment. Dual schemes are also used in some cities with the municipal authorities compiling data from each utility record. The maintenance of such records is fairly straightforward once each authority has agreed to implement a competent system.