

TRUCIAL STATES COUNCIL
Development Office

ROADS IN THE TRUCIAL STATES

Several authorities have now constructed roads in the Trucial States and, whilst there appear to be many differing types, most are a repeat or a modification of the Dubai-Sharjah Road.

Apart from some early town roads in and around Dubai, constructed under the supervision of the State Water Engineer at the remarkably economical price of just over BD6,000 per kilometre, the Dubai-Sharjah Road was the first major paved road project. This 13½ kilometre length was completed at the end of 1966 at a total cost of just under BD 430,000 or BD 31,700 per kilometre. The work was financed by the Development Fund and designed and supervised by Sir William Halcrow & Partners. Towards the end of this project, smaller projects to similar designs were carried out for Town Roads in Sharjah, Ajman, Umm al Qawain and Ras al-Khaimah, again designed and supervised by the same Consultant.

The only other road completed under the Development Fund, at about this time was the Khan Village Road, a distance of just under 4 kilometres, which was carried out as a deliberate experiment to evolve a satisfactory low-maintenance design at a far more economical cost. Despite certain difficulties arising from the route which ran between two creeks, which at high spring tides used to interconnect, the road was completed at a cost of just over BD. 9,000 per kilometre.

The design principle on which this road was constructed was that of a completely protected arc containing an 8 metre carriageway with 2 metre shoulders each side and gently sloping banks. After over two years of use, which has included heavy subkha - hauling vehicles crossing the road transversely, the amount of maintenance required has been practically nil and the experiment can be considered an impressive success, when balanced against the cost of other recent roads in the Trucial States and the troubles which have beset them.

Sizeable maintenance expenditures have already had to be met on the Dubai-Sharjah Road, for example, on banks and shoulders, on surfacing and even on kerbs. Similar high maintenance can be predicted for almost every kilometre of other roads, which have been constructed to this type of design and are left with virtually unprotected banks and shoulders.

In consequence the principle of protection from existing ground level on one side to existing groundlevel on the other is being adopted on all roads in similar country constructed with Development Office funds.

From the best information the Development Office can obtain, a comparison of costs would appear to be as follows:-

Road	Length in Km.	Width of carriageway meters	Total Cost BD,000	Authority Responsible	Approx. Cost per K.m. BD.
Dubai-Sharjah	13½	11	427	T.S.Council	31,700
Khan Village	4	8	37	- do -	9,000
Sharjah-Ras al- Khaimah	116	8	3,500	Saudi Arabia	30,170
Sharjah-Dhaid	48	8	1,300	Abu Dhabi	27,080
Dubai-Khawanij	24	11	685	"	28,540
Sharjah-Khan Vill.	2.7	16 (a)	120	Sharjah	44,500
Abu Dhabi-Al Ain	145	16 (a)	14,000	Abu Dhabi	96,550
Abu Dhabi Town Rds.	45	16 (a)	2,500	"	55,550
Al Ain Town Rds.	23	16 (a)	2,500	"	108,700
Abu Dhabi Corniche Road	6.5	24 (a)	1,400	"	215,380

(a) Dual carriageway

Recently tendered quotations for the 120 Km. Abu Dhabi - Dubai Road (width 8 metres) price this at from just under BD 30,000 to over BD 50,000 per kilometre, without design and consultancy fees.

The Development Office's present road works, being carried out by Public Works Department direct labour, with assistance from the Royal Engineers unit in the Trucial States, has been concentrated over the past two years on the East Coast and on the Wadi Ham, following a report for the Council by Sir William Halcrow & Partners in 1967 on the feasibility of a transpeninsular road.

The total length of this project is 75 kilometres from Khor Kalba northwards along the East Coast to Husn Dibba and some 50 kilometres, mostly through mountain country, from Fujairah-Ghurfa on the Coast, through Masafi and Siji to Dhaid - a total distance of 125 kilometres.

The initial work on the project commenced in 1967 only as an improvement of the very rough track through the mountains, so as to make the trip to the East Coast less time-consuming and exhausting; but always with an eye to making the project more permanent as funds became available and as portions of any permanent route appeared to be finalised. Thus in early 1968 when further and larger funds were made available, the scope of the work had grown to include opening up a roadway northwards from Khor Fakkan to Dibba, previously only accessible on foot or donkey; this latter work included opening up three mountain passes and skirting round the bottom of three major headlands. Vehicles were able to pass through to Dibba by August of that year.

At the same time and as part of the same more permanent approach to the project, works began on the permanent road formation between Fujairah and Khor Fakkan along the Subkha flats, a distance of some 25 kilometres. This together with the necessary culverts, was substantially completed by mid-1970.

Meanwhile considerable works were going on in improving and consolidating the newly opened roadway between Khor Fakkan and Dibba; this included widening the passes, building retaining walls both for improving the gradients at passes and to protect the road from high seas round headlands, filling to improve gradients and sight-lines, and on certain selected lengths in hand-pitching with immediately available stone and coral on raised beaches.

Every emphasis has been made in all the work to make use of the materials immediately available, so that whilst the dimensions of carriageway and shoulders remain constant, the method of structural support changes with each differing type of terrain.

As suitable lengths of the road-base are made ready, the next stage (and this is now imminent on some lengths) is to lay a two-coat surface dressing over the whole formation. This two-coat surface dressing will provide an adequate wearing surface for the first few years with the amount of traffic envisaged, as well as protecting the structural work from the effects of the weather.

The final stage would be the addition of an 8 metre wide asphalt macadam carriageway as a final surface.

The estimated cost per kilometre of these stages as carried out by the Public Works Department is at present:-

	<u>BD per kilometre</u>
1st Stage Road formation and culverting	5,200
2nd " two coat surface dressing	<u>4, 750</u>
Total immediate cost	9,950
3rd Stage Asphalt Macadam	<u>6,000</u>
<u>Total final cost</u>	15,950

This compares favourably for a road designed to be maintenance-free in comparison with other roads so far constructed (and at prices given earlier) whose maintenance is almost certain to prove very costly.

At this present time, the bulk of the work is concentrated on the Wadi Ham on the eastern side of the mountain range, which for many years has been regarded as one of the most formidable stretches of track to negotiate in all the Trucial States; here the roadway will be formed up above the Wadi bed; four bridges and several major culverts are being built and a start has been made on the construction of the raised road-bed, where the route must of necessity remain in the wadi, but the final formation will be brought above flood levels. A beginning of the second stage two-coat surface-dressing is due to begin in a week or two in the vicinity of and west of Masafi.

Ambitious and dramatic as this project may sound its completion will only bring about the normal and obvious advantages of any new trunk road - an improvement in medical and all other services and an outlet for agricultural and marine produce to marketing areas.

A further road proposal being surveyed and studied by the Public Works Department promises even more. This is a road running from south of Ras al-Khaimah (at about Digdaga), south-wards to Buraimi/Al Ain, a distance of approximately 175 kilometres along the gravel plain between the mountains and the sand dunes. Whilst this road is regarded as a necessary one for a good trunk network for the Trucial States, it also follows the line of developed agriculture and also potential agricultural land not yet in use.

By its careful siting to the east of agricultural lands (present and future) and by its being structurally designed in the form of a flood barrier, the following additional results are expected:-

- (a) the protection from floods of existing areas such as Dhaid, Mileiha and Hamraniyah as well as sizeable other areas not yet developed.
- (b) by retaining waters to the east of the road barrier and having it diffused over the gravel plain to percolate into the subsoil, the progressive improvement of the quantity and quality of all ground-waters westwards to the sea.
- (c) in the necessary maintenance works of removing silt washed down at flood times, to keep the gravel plain surface open to percolation, the winning of top dressing soils for garden areas.

Two experts, Professor Peter Rowe, Professor of Soil Mechanics, Manchester University, and Mr. Kenneth T. Bass of Rofe, Kennard and Lapworth are now in the Trucial States for a short period to take a first-hand look at the project and to advise on the Soil Mechanics aspect and the Hydrology aspect. It is hoped that with their advice a final design can be evolved in the very near future. Budgetary provision exists for a start on a short length of the work and it is hoped that work on it could begin quite quickly East of Mileiha Agricultural Station, which is in urgent need of flood protection.