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### The Yemeni Heritage

Unlike many other countries in the region, the Yemen Arab Republic has a unique heritage of buildings, urban centres and civil constructions. Its traditions of construction were built up through centuries. Archaeological remains dotted over the countryside testify to its glory, and many buildings and urban centres still functioning today affirm its vitality. The style of construction is so unique and authentic that surviving examples, some of them breathtaking, evidence the heights reached by Yemeni builders. Their genius was not cramped to create a string of monotonous structures. In different regions of environment and with differing building materials, they devised masterly styles and technologies of construction.

In the past the construction industry grouped its basic components and functioned like a craft-oriented activity to satisfy the needs of the community. Rich traders and powerful tribal leaders were patrons of construction. Affluence in trade and commerce brought into existence buildings and urban centres that fostered the crafts and intellectual pursuits, and agriculture provided the basis of stability. Anonymous master builders and workers formed an integral part of the community. They utilised only locally available building materials to fuse form and function in their creations. Theirs was an elementary but effective organisation for construction.

The compelling merits of this model of the construction industry, which survived with almost no change over centuries, were many. Foremost was the application of technology utilising only those materials that were available and could be transported easily to the site. Designs were such as to meet the needs of the environment, never to violate it. Except along the stretch of the Red Sea that was exposed to trade routes, tradition was not under the influence of style or fashion.

Civil constructions included dams and intricate systems of irrigation canals such as at Ma'rib; trade routes and daring

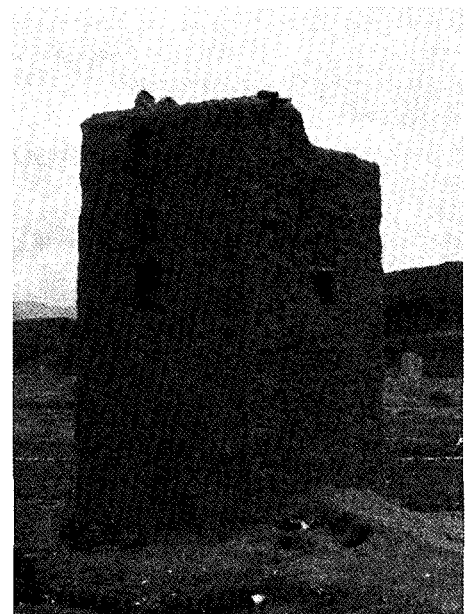


*Stone tower on road between Amran and Kohlar, Yemen Arab Republic.*

*Photo: C. Little/Aga Khan Awards.*

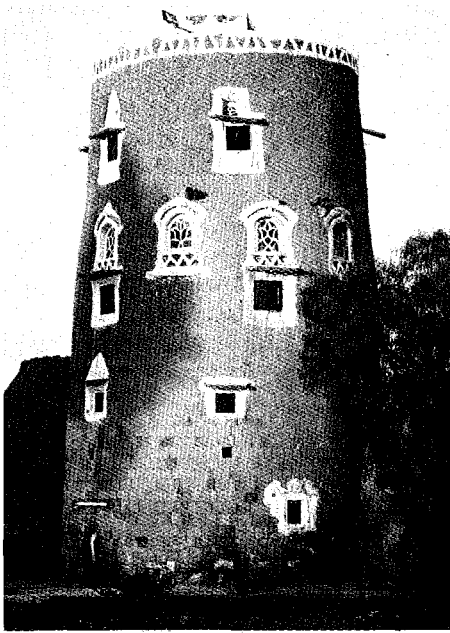
bridges such as those on the Shaharah road; fortifications such as those on the way to Ta'iz; agricultural land terracing to utilise every drop of rainfall without land erosion; city walls, gates, and defence fortifications; and wayside structures to water conserving pools. Public buildings, utilities, and communal facilities; individual residential buildings; and large urban centres all still function in keeping with the traditional mode of community life. They are the living remains of that industry.

It is not possible to document in one place all the achievements and history of construction in this country. A few examples are appended to this paper to illustrate the virtuosity of Yemeni buildings and a brief bibliography is given. Research on building in Yemen has gained momentum in the past few years. Today experts and travelers are exploring, writing, and illustrating one aspect or another of the heritage of this long-isolated country, which finally opened its doors to the work after undergoing a revolution in 1962.



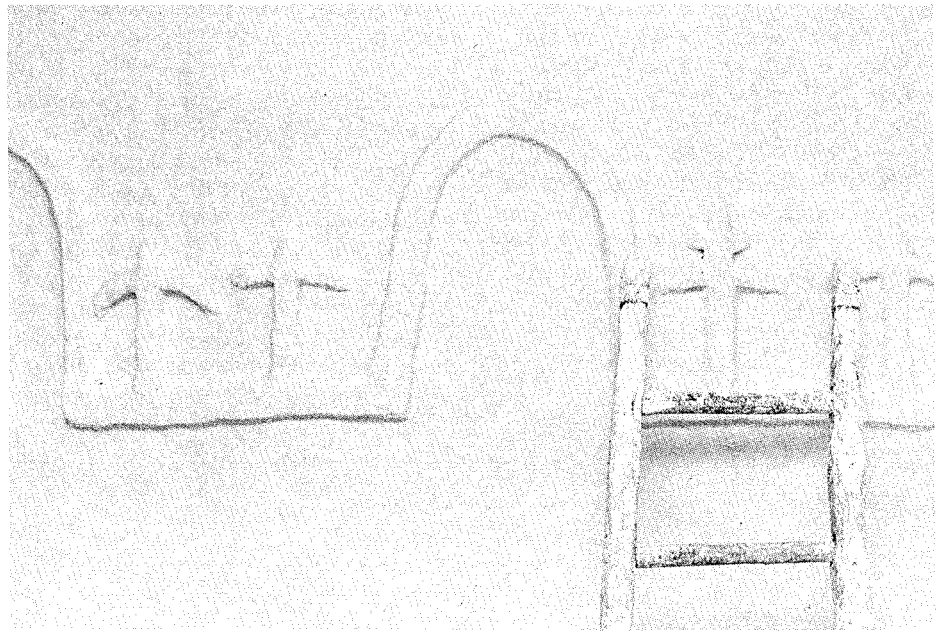
*Rada'a, Yemen Arab Republic. A guard tower for agriculture fields.*

*Photo: W. L. Porter.*



*A round house with fortified base.*

*Photo: C. Little/Aga Khan Awards.*



*Detail of plaster relief work in a Yemeni mosque.*

*Photo: C. Little/Aga Khan Awards.*

### Period of Transition

The political revolution of 1962 was a turning point for the country, especially in its interior highlands. Nearly eight years of internal strife and dissension followed before the YAR set its course of development. From 1973, the process of building a nation was begun with a three-year plan, the first attempt of its kind to consolidate the gains of the revolution. The second effort, a five-year plan, was a vastly improved performance aimed at co-ordinated progress in different sectors of the economy.

Faced with the tremendous task of nation-building, the new government invited many national and international organisations and humanitarian agencies to assist in its socio-economic development. Funds and expert assistance poured into the country during the transitional period from 1973 to 1981. With the old institutional framework, only a modicum of administra-

tive culture, and almost no technical and managerial cadres, it was impossible for the new government to control and channel this sudden inrush of developmental assistance. The Ministry of Public Works, which should have looked after the smooth transition of the construction industry, was no exception to this general situation within the government.

The limitations of the Ministry of Public Works and the concern of other new ministries and authorities to provide infrastructure and rapidly achieve physical goals created a "free for all" situation. Every department of the government involved itself in the construction industry. They started choosing their own consultants, supervising procedures for the tender of large projects, awarding works, and generally mismanaging. Under the pressures of expanding assistance and credits, they lost sight of the need for coordination of efforts. Amateur management thus had a field day in the transition period.

Recognising the weakness of institutions, bilateral agencies pushed ahead with development, allowing for minimal government involvement in the process. They functioned almost like para-government departments.

In keeping with Yemen's long tradition of self-help and co-operation in community development, local development agencies came into their own tempo during this period and, receiving encouragement from the government, went ahead with their own programmes. In the governorates and districts they did commendable work at the grassroots level to provide roads, schools, clinics, and irrigation and water supply schemes in the interior. But, obviously, this can no longer continue. Local development associations can no longer function without proper technical and institutional guidance and help.

Thus, both in the public and private sectors, the construction industry was thrown out of gear. Different ministries of the

government competed inefficiently for control of the industry. At one point, for example, the Ministry of Economy concerned itself with brick-manufacturing projects while the Ministry of Petroleum and Mineral Resources tackled stone-cutting projects. Such confusion will continue until the government decides to strengthen the Ministry of Public Works, which is the only legitimate wing of the government to deal with the industry, to take control of the construction sector in all its aspects. The industry is now taking a new shape, and this is the time to mould it.

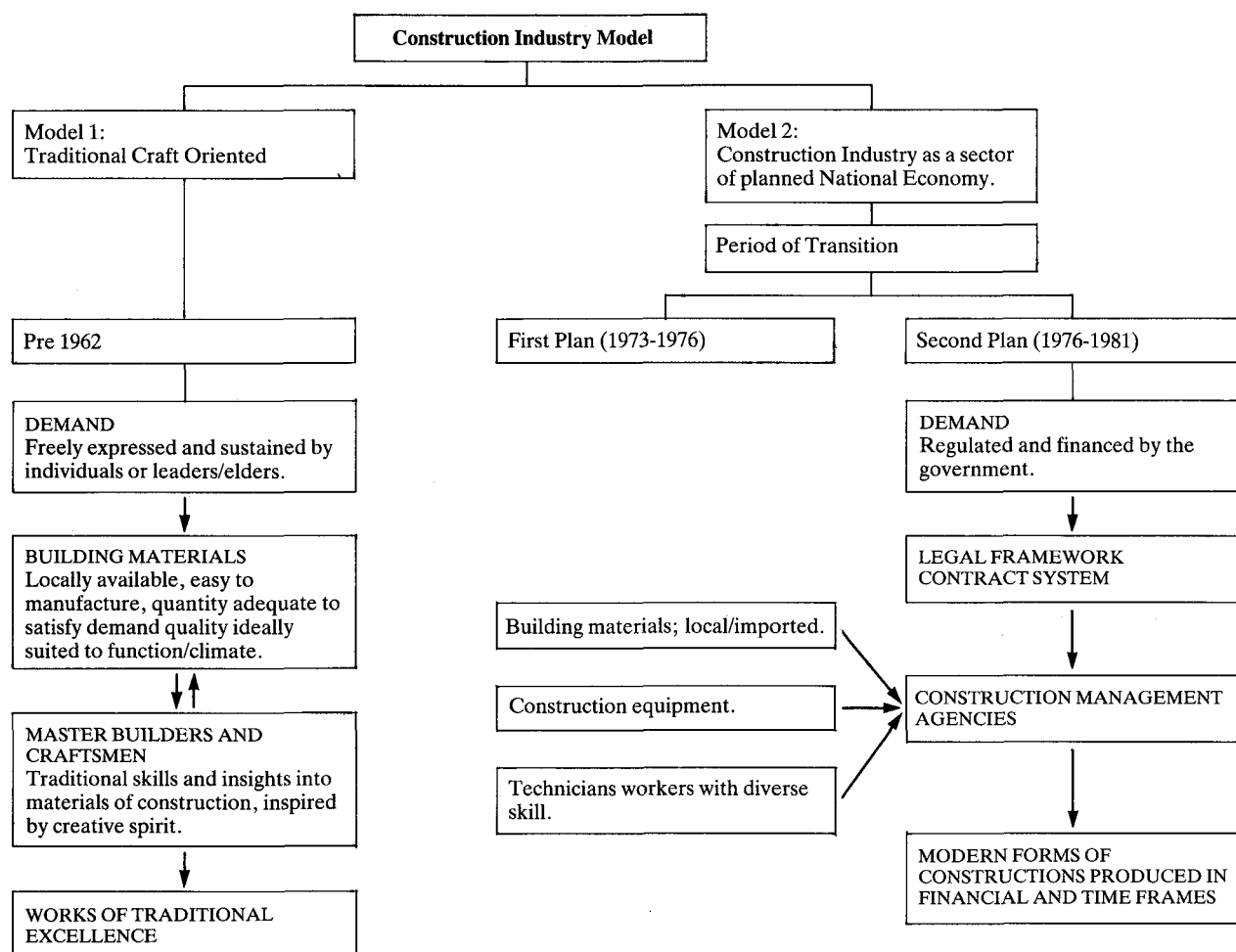
### The Emerging Model of the Construction Industry

Two conceptual models of the construction industry are juxtaposed in Figure 1: one pre-1962 and the other as it is now emerging. These models are over-simplified for quick appraisal of an otherwise complex process. Comparison of the two will help us to visualise the structural changes that are taking place and the stresses that are generated in the process. The construction industry has many interfaces with other sectors of national development; it inter-

acts to modify, and in turn to be modified by, these sectors.

The first departure to be noted is the very nature and volume of demand for construction. In the past, emphasis was first and foremost on the fortified security of the community. Within the confines of city walls, individuals lived, worked, and prospered, generation after generation, in a set social mode. Their aspirations varied little. Their pace of work depended upon the affluence and power in the region, which very often shifted its base. The construc-

Figure 1

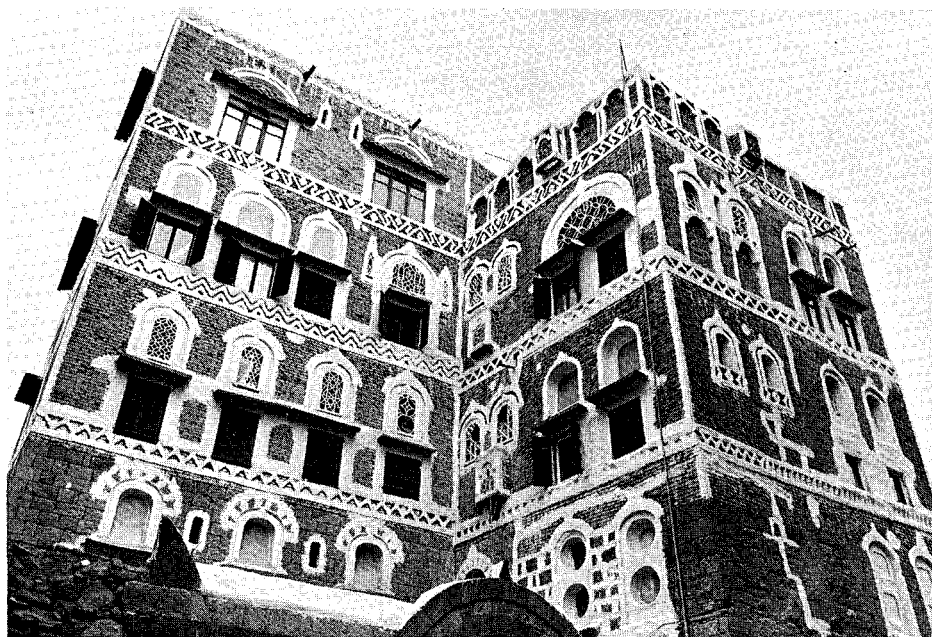


tion industry flourished as a craft, and demand was adjusted according to its capacity to produce and the natural resources available. Except in matters of defence, the time span for the completion of facilities was not rigidly set.

As development experts know well, the steps to be taken in planning are, first, to determine the facilities desired by a community or nation in a given period of time, then to grade them according to the priorities set by consensus within a government, then to mobilise the resources for their realisation, then to set physical targets for achieve, and finally, to press on and push for the achievement of these goals. This process of planned development puts tremendous pressures on natural resources, man-power and institutions. Above all, it requires self-discipline and patience for co-ordinated results to emerge. But unless you aim high, planners believe, you don't shoot your target.

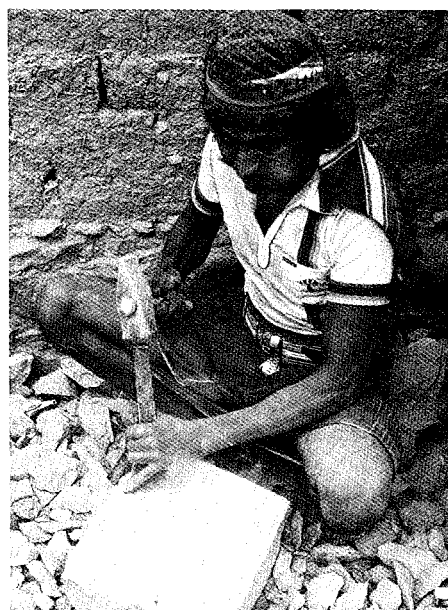
Table 1 shows the pace set in the transitional period under discussion. The outlay on construction in 1977 was proposed to be YR 586 million, not including housing. It is expected to be YR 1,666 million in 1990. If the housing projects are considered, these figures swell. Tables 2 to 4 indicate the importance of the construction sector in national development efforts. In absolute terms, the figures may not appear very impressive; but, considering pre-1962 developments, this is a very ambitious pace for achievement. It set in motion all other parts of the industry and created a fast-moving economy and employment.

The impact of planned development in Yemen was felt in the building materials sector of the construction industry. In 1973 the rate at which materials were quarried by private owners was inadequate to meet the demand for construction. By 1976 all that increased were the prices of these materials. Quality deteriorated. The demand for new materials shot up, and each consultant specified only the products with which he was familiar. This generated a scramble for imports. The growth of imports in the transport sector out-num-



*Private residence, Sana'a. Richly ornamented facades, such as these, are typical for wealthy households in Sana'a.*

*Photo: C. Little/Aga Khan Awards.*



*Yemeni stone cutter.*

*Photo: S. Özkan.*

bered everything because the goods had to be moved around. A variety of new equipment came into the country.

The co-ordination of import policies required for the construction industry was lost in the din. Whatever material was unloaded at the port was used up. New items appeared on the market frequently and disappeared rapidly. It was difficult to specify construction products and then receive them in sufficient quantity, unless one took to importing materials for the project on a priority basis.

Following the import of new materials came the introduction of new techniques of construction, new equipment, and new skills from outside the country. A new breed of technicians and workers flowed into Yemen, while local traditions were pushed into the background. The traditional Yemeni knowledge, experience, and insight regarding local materials started to disappear quickly. The construction

Table 1 Forecast of Construction Demand 1977-90

Year	Housing	Construction other than housing					Subtotal	Total
		Offices	Education	Industry	Health	Public Works		
1977-78	716	164	94	82	53	193	586	1302
1978-79	795	182	104	91	59	214	650	1445
1979-80	882	203	115	101	66	237	772	1604
1980 (6 months)	465	110	59	51	34	127	381	846
1981	1033	244	131	113	75	282	845	1878
1982	1147	271	146	125	83	313	938	2085
1983	1273	301	162	139	92	347	1041	2314
1984	1413	334	180	154	103	385	1156	2569
1985	1569	370	200	171	114	428	1283	2852
1986	1741	410	222	190	127	475	1424	3165
1987	1810	428	230	197	132	494	1481	3291
1988	1883	446	239	205	137	513	1450	3423
1989	1958	464	249	213	142	534	1602	3560
1990	2036	482	259	222	148	555	1666	3702

Source: YAR. Prime Minister's Office. Central Planning Organisation. Statistical Yearbooks 1975-1981

Table 2 Expected Share of Construction in Gross Fixed Capital Formation

Sector	Engineering	% share	Buildings	% share	Total Construction	% share	YR (million)
	YR (million)		YR (million)		YR (million)		
Agriculture	1255	55	57	3	1312	58	2276
Industry	413	12	815	23	1228	35	3545
Construction			15	3	15	3	451
Commerce			379	60	379	60	628
Transport & Communication	4440	89	10	1	4450	90	4925
Finance			15	16	15	16	93
Housing			2085	100	2085	100	2090
Services	50	3	1247	64	1297	67	1993
Total	6158	38.6	4623	28.9	10781	67.5	15971

Source: YAR. Prime Minister's Office. Central Planning Organisation. Statistical Yearbooks 1975-1981

Table 3 Annual Growth in Various Sectors 1973-76

Sector	Average Annual Growth (percent)
Agriculture	5.0
Industry	8.6
Construction	5.5
Transport	8.0
Trade	10.4
Finance and Banking	35.4
Services	7.1

Source: YAR. Prime Minister's Office. Central Planning Organisation. Statistical Yearbooks 1975-1981.

industry lost its character as a craft-based industry.

The government, with the help of the World Bank and UNIDO, has searched for the ways and means to upgrade the local building materials industry and to discover local alternatives. (Their reports and recommendations are listed in the bibliography.) Since 1979, these agencies have made efforts to draw the serious attention of the government to this aspect of the industry. UNDP and UNCHS have extended institutional support to the Ministry of Public Works, the primary agency concerned with the construction industry. However, implementation efforts have not yet succeeded. Bilateral agencies have taken up vocational training schools and other training activities; but their impact on the total industry has yet to be felt. Preparing the base of manpower in the industry, and setting up institutions to serve it, are tasks that are going to take time.

Construction booms began in the neighbouring Gulf countries in the 1960s and attracted skilled labour from all over the region, including Yemen. In 1975 about 280,000 Yemenis were working outside the country, remitting some 375 million U.S. dollars annually. In 1979 this remittance rose to 1.5 billion U.S. dollars. The national exchequer gained much-needed

Table 4 Employment Trends 1975-85

(in thousands)

Year	Construction	Total Employment	Construction as % of Total
1975	48.7	1059.9	4.6
1980	148.6	1331.3	11.2
1985	215.7	1543.6	14.0

Source: YAR. Prime Minister's Office. Central Planning Organisation. Statistical Yearbooks 1975-1981.

foreign exchange for development, but the nation lost its pool of skilled workers and human resources. This introduced a paradoxical situation in which Yemeni workers found outside employment more profitable, while many foreigners found Yemen a more hospitable country in which to work.

Future trends in labour migration are difficult to predict, but the current trends in neighbouring countries may spell the end of construction booms in the region and compel many expatriates to return to their own soil. Those who return will bring with them valuable experience. Perhaps, as a result, the construction industry in Yemen will start with a higher bench mark.

In the period of transition in Yemen, the education and training of technicians could never catch up with demand. Formal as well as technical education suffered, not for want of a student body but because of the shortage of trained teachers and educational administrators. Many students who went out of the country and returned with degrees but had practically no experience, occupied managerial and administrative positions and contributed little to their professional field. Until now there has been hardly a professional body on which the industry may rely; the Association of Engineers, for example, was not formed until 1980.

The government has taken steps to improve the situation. Vocational training institutes, started with bilateral aid, expect to train over 400 technicians annually, though that number will hardly fill the requirements of an expanding sector.

While on-the-job training efforts cannot be readily assessed, there appears to be little on-the-job transfer of skills, and what little exists is not systematic. Foreign consultants and contractors who came for work in the country on a project-by-project basis are not motivated or equipped to transfer their technology or skills to local engineers and technicians. Controversy often surfaces over the utility of Yemeni counterparts in a project.

To keep to schedules of construction, foreign contractors brought in a large amount of equipment and machinery. Upon completion of projects, many of these items were left behind. Local contractors also acquired construction equipment and plants on their own, but they did not have the managerial capability to fully utilise the machines. To add to this difficulty, maintenance and repair facilities in the country were woefully inadequate, and spare back-ups could never be satisfactory because of the diversity of equipment in the country. The speed with which the construction industry will now take off depends much on the action that the government will take to hire management and to establish a construction equipment pool with good facilities for back-up.

Like other modern industries, the new model of the construction industry in Yemen will depend upon managerial cadres for obtaining optimal turnover from input. This discipline has not yet had any impact, but the younger generation of contractors is showing keen interest in learning the skills for greater profits.

The orderly functioning of the industrial



A craftsman making a gypsum window according to traditional methods.

Photo: S. Özkan.

sector in a country depends upon the general legal framework, with particular legislation to govern an industry. The legal framework is based on the *Shari'a*, which lays down principles and guidelines for business dealings but not for construction contracts and related civil transactions. Legal concepts are so basically different from those in the West that reconciliation is a difficult task. In the period of transition there was considerable confusion in this area. The multiplicity of agencies working according to their own conditions of contract, and the differing languages in which contracts were written, only added to the confusion.

Concepts differed on major issues such as the validity of agreements, the obligations and liabilities of two parties in a contract, the resolution of disputes, penalties and damages, the adequacies of compensation, acts of God, and force majeure. So far not a single form of contract conditions has been agreed upon. For the smoother operation of the industry, this basic need must be pragmatically fulfilled. The health and vigour with which the new model will grow depends upon a clearly understood legal base of operations, reduction in contract risks, and effective financing within the construction industry. Simultaneously,

labour laws, safety in industry, accident prevention and responsibilities, compensation, and insurance are other areas of the legal framework that need attention.

The financial procedures for sanctioning and disbursing payments for works are, at present, cumbersome. Public accountability and the budgeting system itself need to be work-oriented. This area within the government will assume importance when funds for projects become scarce.

### Symptoms of Stress

Working in Yemen, for nearly six years during the period of transition in the construction industry, I frequently saw instances of the stresses in the changeover of the system/model. Many others who have worked here during this period undoubtedly have had similar experiences. A few are mentioned here to highlight the process of change and to show their effect upon the industry. Those who are engaged in the process will be able to weigh their importance:

- A project for mechanised rock-quarrying and stone-cutting was stalled for a long time because the end product did not bear hand tool marks or something similar in appearance.
- Plans for telecommunications training buildings received adverse reviews because traditional *gamarias* were not used in elevation and thus they had a completely modern look that was in keeping with their function.
- In a very large public building complex, plans for buildings with completely modern facades were approved with a proviso that a dome on the main building should be constructed as in "Capitol Hill," to give the composition of a classical look.
- In areas of civil contracts and agreements, concepts are at odds. For example, a contractor whose workmen were negligent and cast basement columns out of plumb was put in jail.
- In one contractor's analysis of project

costs, charges for insurance against workers' compensation, damage to materials, etc., were considered to be unfair in principle.

- Lease agreements for accommodation proved to be inconvenient to a lessor halfway through the period of lease. He rescinded them unilaterally.
- A contractor was held responsible for defects that were noticed after five years of completion and were beyond doubt due to faulty structural designs supplied to him by the owner. The designs were drawn by an anonymous, unqualified engineer.
- To demonstrate against an alleged injustice and seek the mediation of a minister, a few villagers brought a calf and butchered it in front of his office one day early in the morning.
- A bilateral agency working almost on its own constructed a hospital complex providing staff quarters in duplex flats of prefabricated construction, a disco-video hall, and a swimming pool with an outdoor barbecue facility.
- Municipal by-laws do not seem to override the right to property. A person often insists on covering his entire lot, without leaving off-sets, and insists on constructing a high compound wall, creating a blind corner at the road junction.
- Conditions of contract entered into by one wing of government authority were not honoured by another.
- In one case of fraud a sizeable amount was recovered from the bank accounts of an employee. Part of the recovered amount was disbursed by an official of the authority as rewards for information.

### Institutional Stress Points

Once again, reference to Figure 1 will reveal the areas where change in the model is occurring. The legal framework, the laws of contracts and agreements for works, and public accountability are the means to make the industry move in a more certain framework. Once this area is cleared prag-



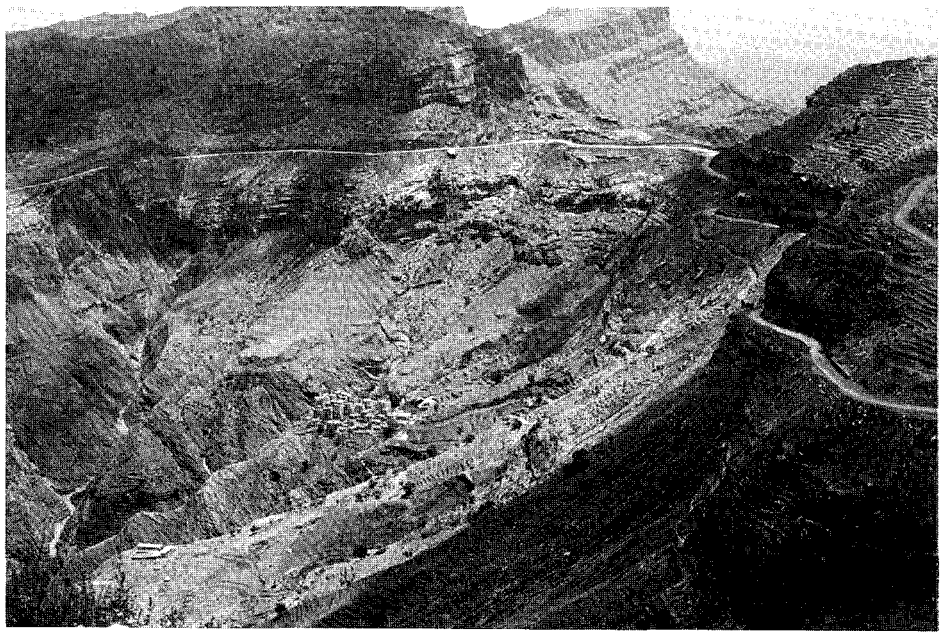
matically, others can be tackled. Local construction industry representatives, professional bodies, and foreign consultants with experience working in the country should be called upon to suggest a progressive base for the industry.

The local building materials industry needs revival. Manufacturing should be taken into the joint sector, if necessary, to ensure co-ordinated growth. This will not be an easy task; compensation for land and quarries, and their takeover, are going to be problems that will at times necessitate law and order situations.

The part of the building materials industry that is engaged in import needs better support, with forecasts and finances for maintaining a steady stream of useful materials both for the public and private sectors of industry. A joint-sector organisation will be needed as an equipment pool to provide the rental of construction equipment, transportation of materials to sites, and facilities for maintenance workshops. Government departments, as well as contractors, need to be trained in construction management techniques in order to obtain better results.

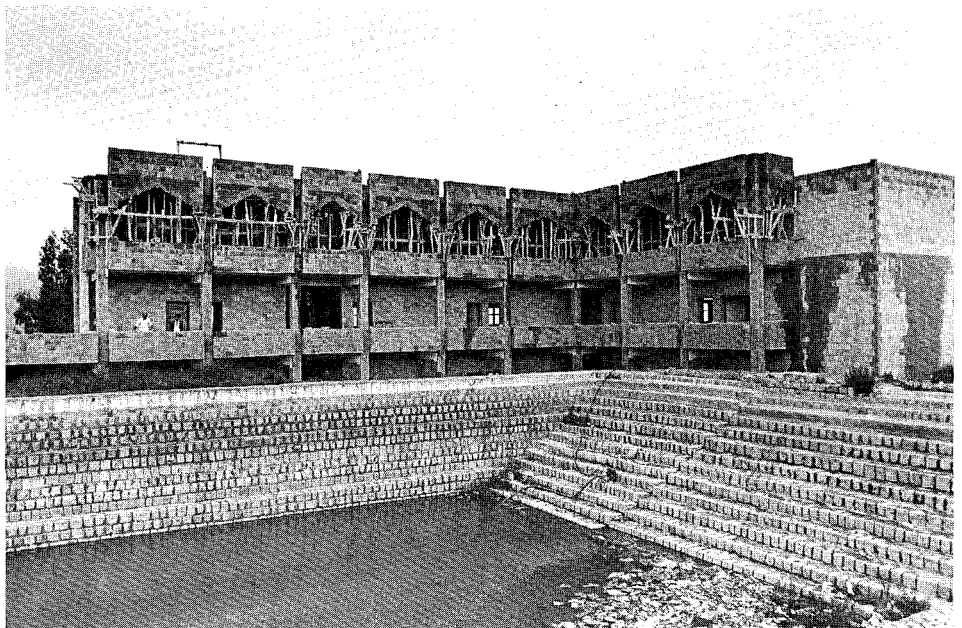
The most explosive issue of all is going to be over the labour sector. With the influx of Yemenis returning from neighbouring countries, the enforcement of labour laws, keeping up productivity, and ensuring payments will present problems not faced thus far. Foreign contractors will prefer to take up equipment-intensive works; only the Chinese will continue to work with their own labour. Either way, the transfer of skills or technology to Yemeni counterparts is going to be a tardy process.

The desire to preserve traditional forms of construction will be recurrent. Unless this desire is channeled with real understanding, "old appliquéés" will be the result. In-depth study is needed to delineate what constitutes the essence of the tradition and how far it can be used in new works. As long as people preserve their old social ways and culture and the majority feels at home in the old-style environment, it will be wise to give safe outlet to their creati-



*A newly constructed highway in the mountains.*

*Photo: S. Özkan.*



*A religious institute under construction in Hajjah.*

*Photo: C. Little/Aga Khan Awards.*



vity. Since Yemen still lives in its villages, its urban centres and structures should not be radically divorced from the village.

### New Directions

What shape and direction will the construction industry in Yemen take? The answer can be reasonably predicted against a perspective of regional trends, modified by the factors peculiar to Yemen.

Development activities that were financed and implemented bilaterally will slow down considerably. With the recession in the construction industry in neighbouring countries, Yemeni labour may return home. This would have the effect of reducing remittances while at the same time swelling the ranks of technical manpower within the country.

The national economy will readjust itself to accommodate these factors. Funds borrowed from international agencies will be spent on specific projects. The share of the local construction industry in such works will be limited to the local building materials sector. The rate of growth of the industry will level off, so that it will hardly cover the urban growth projects in the public as well as private sectors.

The local construction will have to look to co-operative development for business; indeed, self-help and co-operation always have been Yemeni characteristics. The industry will also have to find ways and means of tempering the inclination towards uncritical acceptance of western models. It remains for us to determine the essence of tradition in Yemeni architecture and construction, how much of it can realistically be reflected in new works, and by what means. In this way the construction industry in Yemen can be made to evolve in a new direction.

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