

TCDPAP FOCUS

Vol. VIII A Newsletter of Technical Consultancy Development Programme for Asia & the Pacific (TCDPAP) Issue 01 November 2002

IN THIS ISSUE

1. Biennial Plan for TCDPAP 2001-2002 and 2002-2003
2. International Training Programme
3. National Seminar on Integration of Environmental & Quality Management System in the ESCAP Region
4. Some Considerations in Bituminous Mix Design Awaiting Implementation in Highway Construction
- By Dr. Animesh Das
5. Annual TCDPAP International Workshop

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Printed at Alpha Lithographics Inc.
9811199620



From Secretary General's Desk

Fifteen years ago, companies competed on price. Today it's quality. Tomorrow it's design.

Robert Hayes, Professor, Harvard Business School

As the developing economies of Asia and the Pacific integrate with the world economy, Quality is the minimum barrier to market entry that must be achieved and surmounted. To address this urgent need TCDPAP, jointly with UN-ESCAP and APCTT is organizing a series of National Seminars in 9 countries, titled "Integration of Environment & Quality Management Systems in the ESCAP region." The seminar program is supported by the Dutch Government.

Indeed Quality and Environment are inter-related and a necessary condition for sustainable development. Rapacious exploitation of *Mother Earth* just cannot be justified or supported in the name of progress. Therefore the Annual TCDPAP International Workshop on "Sustainable Development and Poverty Alleviation: Challenges & Opportunities for Consultants" is very appropriate and timely for our region.

Consultants in the region have a very important role to play. As our economies mature, the design element in the product or service will define the unique selling proposition. This would naturally require a much higher level of intellectual input, thus offering major challenges and opportunities to knowledge workers, such as, consultants.

Biennial Plan for TCDPAP 2001-2002 and 2002-2003

The second meeting of the Executive Committee of Technical Consultancy Development Programme for Asia and Pacific (TCDPAP) was held in Three Gorges, China along with International workshop on "Ushering a New Era for cooperation between Engineering Consulting Industries in the Asia and the Pacific Region." During the meeting of the Executive Committee Biennial Plan for the activities of TCDPAP was finalised for the year 2001-2002 and 2002-2003.

1. Database of Consultants

- Database of consultants will consist of profiles of consultants from the Asia Pacific Region (members of TCDPAP)
- Data will be collected by sending mailers to Associations, Directory of Consultants of Associations, websites, through Indian Missions Abroad, Existing data available with TCDPAP Secretariat.
- Collected data to be structured and entered as per broad sectors such as construction, environment, water supply etc.
- The collected data to be put on TCDPAP website and can be linked to websites of various member countries.
- From the collected data a Directory of Consultants can be prepared for the Asia Pacific region.
- At present TCDPAP Secretariat has got data of consultants from India and Iran. Besides this TCDPAP Secretariat has got Directory of Consultants from Malaysia, Indonesia etc. A list of member countries of Pakistan, Nepal, Bangladesh are also available with TCDPAP Secretariat.

2. Training Programmes

- To organise training programmes, training needs are to be identified from various

member associations. Member countries after assessing training needs can send the request to secretariat.

- Based on the above TCDPAP secretariat can organise training programmes but not more than two in one year.
- Participation for the programme to be ensured by local association.
- TCDPAP Secretariat will assist in formulating programme structure and locating faculty for the programme.
- Budget estimate is to be worked out before the start of the programme
- TCDPAP funds can be utilised for such purposes.

3. TCDPAP Website

- Existing TCDPAP website tcdpap.org is to be updated and information related to training programmes, professional practices followed in Asia Pacific countries are to be added.
- TCDPAP website to be linked to other website / homepages of Asia Pacific countries.
- TCDPAP website can be linked to website of ADB, World Bank etc for tender information.
- TCDPAP Focus can be put on website.

4. Publication

- TCDPAP Newsletter
- Proceeding of Seminars
- Directory of Consultants in Asia Pacific Region

5. Member of TCDPAP

- TCDPAP Secretariat to write to consultancy companies who are members of Associations to become

Associate members of TCDPAP.

- Invite and pursue Australia, Singapore, Japan and New Zealand to become members of TCDPAP.

6. Governing Council, Executive Committee Meeting and International Workshops

- TCDPAP Secretariat to coordinate above meetings and workshops as done in past.
- Subjects of such meeting should be related to consultancy.
- Countries papers are to be included in these workshops.
- Each conference is to be attached with

Executive Committee or Governing Council meeting.

7. Other Activities

Besides the above TCDPAP Secretariat will

- Liase with multilateral and other concerned agencies like APCTT, ITC, World Bank, ADB, FIDIC etc for supporting TCDPAP activities.
- Strengthen networking for enhancing collaborations among Member Associations.
- Liase with various chambers of commerce and industry.

CONSULTANCY DEVELOPMENT CENTRE



Organises Sixth NATIONAL CONSULTANCY CONGRESS

THEME: "GLOBAL PARTNERING IN CONSULTANCY"

DATE : *JANUARY 15-16, 2003*

VENUE : *INDIA HABITAT CENTRE,
NEW DELHI, INDIA*

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Topics to be covered

- *Emerging Scenario*
 - Global Partnering Issues
 - Modalities of Partnering
- *Strategies in Global Partnering*
 - Effective Facilitation for Partnering
 - Rights and responsibilities in partnering
 - Role of Exim Banks
- *Opportunities in Partnering*
 - International Trade in Services
 - Enhanced Opportunities in changed context
- *Case Studies*
- *Role of International Institutions*
- *Panel Discussion*

Pic. - 1

INTERNATIONAL TRAINING PROGRAMME ON "HIGHWAY ENGINEERING - NEW TECHNIQUES IN HIGHWAY CONSTRUCTION & CONTRACT MANAGEMENT" - 2-4 MAY 2002.

**International Training Programme on
"HIGHWAY ENGINEERING - NEW TECHNIQUES
IN HIGHWAY CONSTRUCTION & CONTRACT
MANAGEMENT"**

Conducted by

Technical Consultancy Development Programme for Asia and the Pacific (TCDPAP)

in association with

New Zealand Institute of Highway Technology (NZiHT), New Zealand

2 - 4 May, 2002 New Delhi (India)

A Report

During the last (second) Executive Committee meeting of the TCDPAP held on October 23, 2001 in Three Gorges, China, wherein the Biennial Plan for the Programme was Approved, it was decided that the TCDPAP Secretariat shall organise two training programmes with topic of relevance to consultants/ clients in the Region, during the year 2002-03. Accordingly, the TCDPAP Secretariat , New Delhi, India organised a three-day international training programme on "Highway Engineering - New Techniques in Highway Construction & Contract Management" during 2 - 4 May, 2002 in New Delhi.

The International Training Programme was organised in association with New Zealand Institute of Highway Technology, New Zealand.

The New Zealand Institute of Highway Technology (NZiHT), New Zealand provides training and qualification development for a number of sectors in construction industry in New Zealand and is recognised for its ability to work alongside industry, in the entire Asia & Pacific region.

Topics covered and faculty for the three-day programme were -

S.No.	Topic	Faculty
1	Contract Management	<i>Dr. William G. Vance</i> , CEO, NZiHT, New Zealand
2	Some Considerations in Bituminous Mix Design Awaiting Implementation in Highway Construction	<i>Dr. Animesh Das</i> , Asstt Professor, IIT Kanpur, India
3	Geosynthetics in Road Pavements	<i>Dr. G.V. Rao</i> , Professor, IIT Delhi, India
4	Bituminous Mineral & Mixed Design for Asphalt Pavements	<i>Dr.R.S. Shukla</i> , Former Scientist & Head Flexible Pavement Division, Central Road Research Institute, New Delhi, India
5	Highway Pavement Design & Rehabilitation	<i>Dr. P.N. Kachroo</i> , Addl. Director, I C T Pvt Ltd New Delhi, India

Twenty one professionals from various organisations including consultancy and contracting industry participated in the programme. Two foreign delegates from Bangladesh participated in the training programme. Although confirmation were received from Nepal and Sri Lanka, but due to some unavoidable circumstances, they could not participate in the programme. Indian participation was from organisation like Airports Authority of India, HUDCO Ltd, Engineers India Ltd, Indian Army (Engg Wing) etc.

On the first day, DG, CDC & Secretary General, TCDPAP Mr. Somenath Ghosh welcomed the

participants and Mr. Peter Hobbs, Commercial Counsellor & Trade Commissioner (NZDB), High Commission for New Zealand, New Delhi *inaugurated* the programme and *Dr. R.K. Shukla*, Senior Consultant, TCDPAP gave vote of thanks.

At the end of the programme on 4th May, 2002, Dr. Abdul Khaliq, Adviser, Department of Scientific & Industrial Research (DSIR), Ministry of Science & Technology, Government of India presented the *Certificates* to the participants. On reviewing the written feedback received from the participants, it was found that overall performance rating of the programme was 74%.

Pic. - 2

**NATIONAL SEMINAR
on**

**“INTEGRATION OF ENVIRONMENTAL & QUALITY
MANAGEMENT SYSTEM IN THE ESCAP REGION”**

JOINTLY ORGANIZED BY :

**UN- Economic & Social Commission for Asia & the Pacific (ESCAP)
Asian & Pacific Centre For Transfer Of Technology (APCTT)**

and

**Technical Consultancy Development Programme for Asia and the Pacific (TCDPAP)
9 – 11 October, 2002 New Delhi (India)**

A Report

ESCAP in cooperation with APCTT is commencing a project on ‘Integration of Environmental & Quality Management System in the ESCAP Region’ with the financial support provided by Govt. of Netherlands. The main objectives of the project are :

- To develop appropriate training mechanisms for the integration of environmental and quality management systems;
- To facilitate ISO 9000 and ISO 14000 implementation in SMEs in a joint and thus cost and time effective manner; and
- To suggest guidelines in achieving simultaneous third party certifications for ISO 9000 and ISO 14000 implementation.

Under the project, national seminars are being organized in nine countries of ESCAP region namely Bangladesh, China, India, Indonesia, Nepal, Philippines, Sri Lanka, Thailand and Vietnam. The schedules of the programme are as follows :

9-11	October 2002	- New Delhi, India
30 Oct – 1 Nov	2002	- Bangkok, Thailand
4-5	November 2002	- Hanoi, Vietnam
11-13	November 2002	- Jakarta, Indonesia
18-20	November 2002	- Manila, Philippines
25-27	November 2002	- Beijing, China
2-3	December 2002	- Colombo, Sri Lanka
9-11	December 2002	- Kathmandu, Nepal
	December 2002	- Dhaka, Bangladesh

As the first in a series of activities towards implementation of this project TCDPAP Secretariat, New Delhi, India organised a three-day National Seminar on “Integration Of Environmental & Quality Management System in the ESCAP Region” during 9-11 October, 2002 in New Delhi, India.

Topics covered and faculty for the three-day programme were -

S.No.	Topic	Faculty
1.	Historical Development towards harmonization of international standards (ISO 9000 & ISO 14000)	<i>Mr. Sohrab, Chief Executive, Quality Care Services Pvt. Ltd. & Consultant, UN-ESCAP</i>
2.	Unified approach to auditing (ISO 19011) Quality System & Environmental Management Systems	<i>Mr. Sohrab, Consultant UN-ESCAP, New Delhi</i>
3	Conceptual model for integrated quality (ISO 9001) and environmental (ISO 14001) management system	<i>Mr. Sohrab, Consultant UN-ESCAP, New Delhi</i>
4	Harmonization efforts in National Standardizations Systems	<i>Mr. S.K. Choudhury, Director, BIS</i>
5	Approach to integrated certification of ISO 9001 and 14001	<i>Mr. S.N. Goswami, Lead Auditor Quality & Environmental Management Systems, DNV</i>
6	Case Study – 1	Mr. C.P. Prabhu Quality Assurance Manager Heinz India Pvt. Ltd., Aligarh
	Case Study – 2	Mr. Shaily Grover, MD Paramount Surgimed Ltd, New Delhi
	Case Study - 3	Mr. T.K. Job Elias, Manager (Q.A. & P.D.) Vasudhara Dairy –Icecream Plant, Boisar, Tarapur, Maharashtra

59 professionals from various organisations including consultancy and contracting industry participated in the programme. Participation was from esteemed organisations like CBRI, CRRI, CES (I) Pvt. Ltd, NJPC, NTPC, WAPCOS, HSCC Ltd., Indian Army & MES etc.

On the first day, Chairman, CDC Dr. Uddesh Kohli, welcomed the participants, Shri D.K. Biswas, Chairman, Central Pollution Control Board, New Delhi **inaugurated** the programme, Address was given by Dr. Ram S. Tiwaree, Economic Affairs

Officer, UN-ESCAP, Bangkok and Dr. Jurgen Bischoff, Director APCTT and DG, CDC & Secretary General, TCDPAP Mr. Somenath Ghosh, gave vote of thanks.

On the third and concluding day of the programme on 11th October, 2002, Case Studies presentation were given by Heinz India Pvt. Ltd, Aligarh, Paramount Surgimed Ltd, New Delhi & Vasudhara Dairy-Icecream Plant on Implementation of integrated ISO 9001 & EMS 14001 Systems, which was very well received by the participants.

Some Considerations in Bituminous Mix Design Awaiting Implementation in Highway Construction

Animesh Das¹

Abstract: Bituminous mix design is a delicate balancing act between the proportions of aggregate sizes and bitumen content. For a given aggregate gradation, the optimum bitumen content is estimated by satisfying a number of mix design parameters recommended in the specifications. In this paper, some of new considerations related to the bituminous mix design are discussed. Bituminous mix design, with these considerations included, are expected to yield better performance if implemented in highway construction.

1.0 Introduction

Construction of highway involves huge outlay of investment. A precise design may save considerable amount of investment, as well, a reliable performance of the in-service highway can be achieved. Two things are of major considerations in this regard – pavement design and the mix design. The present paper emphasizes some of the new considerations involved in the concept of mix design. Though there are a few equipment used for estimation of stability of the bituminous mixes in the laboratory, the Marshall test is the most popular one, possibly due to its simplicity and low cost. The Superpave recommendations [1,2] have rationalized the concepts of bituminous mix design to a great extent, however, this involves evaluation of mix properties through a number of costly equipment. The discussion in this paper has been kept confined

to the Marshall and fatigue testing only.

Discussion has been covered in two parts in this paper. The first part contains some of the new considerations in the bituminous mix design, and the second part discusses about the concepts awaiting field implementation.

2.0 Some New Considerations in Mix Design Concept

The mix volumetrics, reliability of bituminous mix design and the incorporation of fatigue considerations in bituminous mix design are the three aspects covered in this section.

2.1 Mix volumetrics

In a mix design problem by Marshall method, the volumetric parameters and the Marshall flow and stability values are to be satisfied simultaneously. The volumetric parameters (refer Figure 1) can

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be checked from the Marshall samples, prior to Marshall test. The following are the equations that could be used to estimate volumetric parameters (VMA , VA , VFB) and absorbed bitumen content (P_{ba}). The equations are arrived from the phase diagram of various volume components of the bituminous mix as shown in Figure 1. The absorbed bitumen is an important parameter [2], which is sometimes ignored in

bituminous mix design. However, Optimum Bitumen Content (OBC) without due regard to the absorbed bitumen may not perform well when laid in the field.

$$VMA = \left(1 - \frac{G_{mb}}{G_{sb}} \times P_s \right) \dots \dots \dots (1)$$

$$VA = \left(1 - \frac{G_{mb}}{G_{mm}} \right) \dots \dots \dots (2)$$

$$VFB = \left(1 - \frac{VMA - VA}{VMA} \right) \dots \dots \dots (3)$$

$$P_{ba} = 100 \left[\frac{1}{G_{sb}} - \frac{1}{G_{se}} \right] \times G_b \dots \dots \dots (4)$$

Where,

- P_{ba} = Absorbed bitumen content as a percentage by weight of aggregates
- G_{mb} = Bulk specific gravity of the mix
- G_{mm} = Maximum theoretical specific gravity of the mix
- G_{sb} = Bulk specific gravity of aggregates
- G_{se} = Effective specific gravity of aggregates
- G_b = Specific gravity of bitumen
- VMA = Voids in Mineral Aggregates
- VA = Air Voids
- VFB = Voids filled with Bitumen.

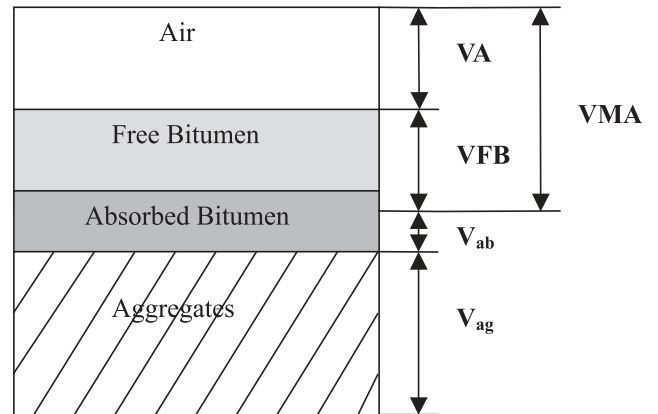


Figure 1. Volumetric Phase diagram of bituminous mix

Marshall stability and flow values are independent parameters, but there is a possibility that the values of *VMA*, *VA*, and *VFB* of a mix would be dependent on each other. Even if they are dependant, there is a chance that if one of them is satisfied within the given range, the others may not. A study has been initiated in this direction, based on the Indian mix specification (3rd revision MOST specifications) for Bituminous Concrete (BC) [3], and it is seen [4] that the volumetric specifications are mutually satisfied over a practical range of G_{mm} and G_{mb} . No upper limit of *VMA* has been specified in the Indian recommendations. However, study [4] showed that the theoretical upper limit of *VMA* is 20%. In separate studies on permeability of bituminous mix [5,6], it was felt that there is a need of having an upper limit of *VMA* from permeability considerations as well.

2.2 Reliability of mix design

Due to inherent variability in the test results, there exists different probabilities of the mix design parameters being satisfied individually. The probability of all the parameters satisfied simultaneously would therefore be lower than their individual probabilities. This concept has been explained [7] in Figure 2, where only *VMA*, *VA* and *VFB* are considered.

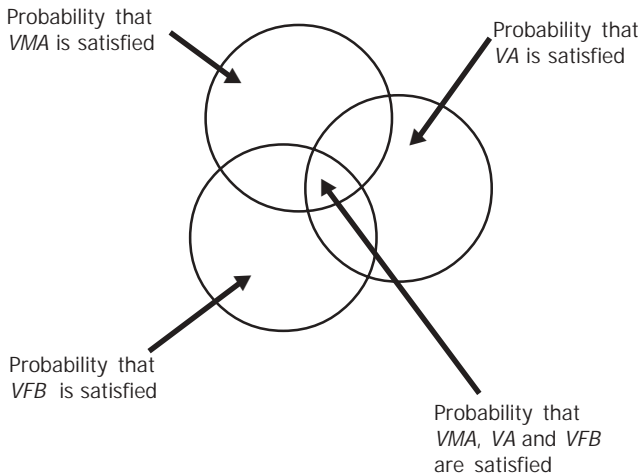


Figure 2. Probability diagram showing mutual satisfaction of VMA, VA and VFB.

The determination of joint probability for all the parameters being satisfied simultaneously can not be obtained through simple multiplication, as the volumetric parameters are mutually dependent. Study has been carried out [4] on BC (MOST specification, 3rd revision) [3], and it is concluded that the if the minimum bitumen content, satisfying all the Marshall parameters, is chosen as OBC, 55% of them would satisfy the specifications of all the parameters at a time. In a similar way, it is found that the probability of satisfying all the Marshall parameters increases if OBC is chosen higher than the minimum. Thus it is recommended that the minimum bitumen content satisfying all the Marshall parameters may not always be a good decision for field application. It is, therefore, justified to use bitumen content more than the minimum required.

2.3 Fatigue considerations

Fatigue on bituminous mixes is an important parameter related to the structural failure of the pavement. Experiments by a number of researchers [8] have suggested that increase in bitumen content enhances the fatigue life. Thus

the higher is the bitumen content, the better is the mix design, provided all the other parameters are within the limit. For example, from Figure 4 (which represents a sample Marshall test data), minimum bitumen content satisfying all the mix design requirements is obtained as 4.70%, whereas taking fatigue also into account, the OBC is obtained as 5.1%.

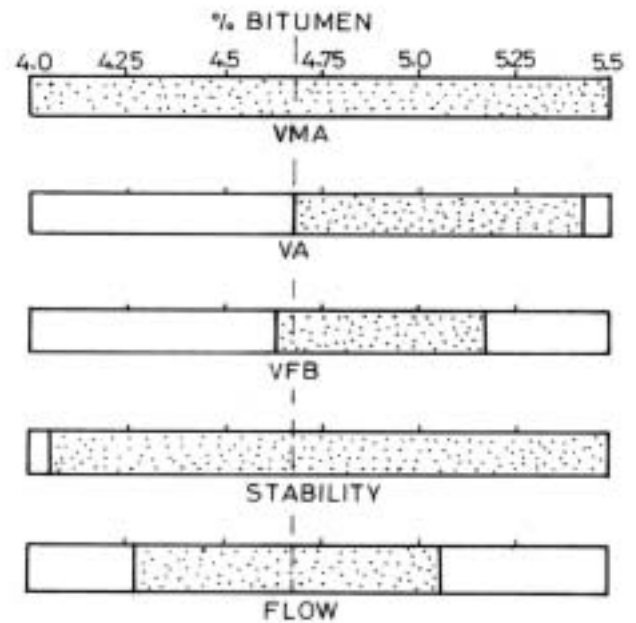


Figure 3. Determination of Optimum Bitumen Content.

3.0 Concepts Awaiting Field Implementation

Two aspects have been discussed in this section (i) evolution of non-standard bituminous mix specification and the (ii) use of different grades of bitumen in different pavement layers.

3.1 Evolution of non-standard mix specification

The bitumen content of a mix should be high enough so that there exist sufficient free bitumen for binding. Insufficient bitumen content makes a mix brittle under traffic. On the other hand, higher

bitumen content causes thicker film around the aggregates which makes the mix more durable. It enhances the fatigue life also. However, increase in bitumen content not accompanied by adequate amount of air voids will result in the fall of stability value of the mix. This happens as the buoyant action of bitumen comes into play and load starts transmitting more through bitumen than through aggregates [9]. Thus, the only way to increase bitumen content (i.e. *VFB*) keeping sufficient air voids (*VA*) is by maximizing *VMA*. So a gradation with high *VMA* value and sufficiently high *VFB* needs to be evolved.

The gradation of BC possibly was derived from the density maximization concept. Figure 4 shows the mid point gradation of BC, which is close to the Fuller's maximum density curve [10]. Studies have been conducted [4,8] on skip gradations, where it is found that with these gradations the *VMA* is increased, yet the fatigue performance and Marshall parameters are satisfactory. Thus there is a need to validate these laboratory findings

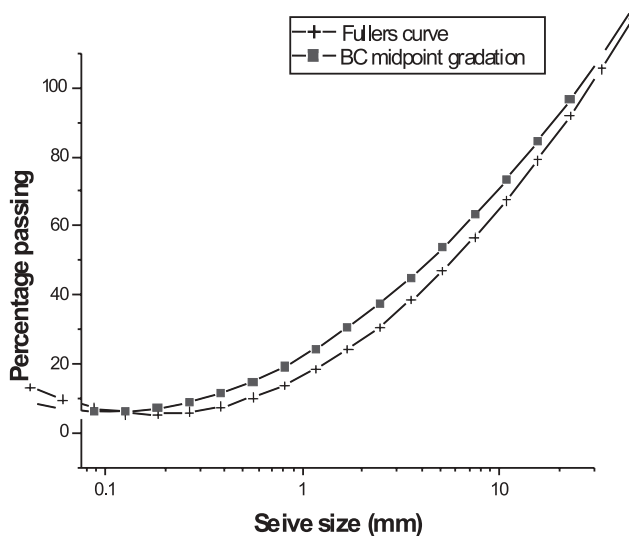


Figure 4. Comparison between mid-point BC gradation and Fuller's curve.

from the performance study in the field, so as to evolve better performing aggregate gradation and bituminous mix than what is recommended presently.

3.2 Use of different grades of bitumen in different pavement layers

Heavy duty bituminous pavements are composed of bituminous binder course and wearing course, for example, Dense Bituminous Macadam (DBM) and BC [3]. Same grades of bitumen are generally used for construction of these layers. Generally same grades of bitumen are used for construction of these layers.

Stiffer grade of bitumen has higher value of elastic modulus, and it causes lesser stains to the pavement layers and also it is expected to show lesser rutting. On the other hand, higher fatigue life as observed for bituminous mixes with softer grade of bitumen [11], indicates greater longevity of the pavement against fracture. It can be shown theoretically [12], that if a pavement is constructed with softer grade of bitumen at the lower layer, and harder grade at the top layer, the pavement is expected to last longer, than a pavement constructed with same grades for both the layers. Further confirmation can only be achieved through field performance.

4.0 Conclusion

The present paper has discussed some of the new considerations involved in bituminous mix design. The concepts discussed in this paper are expected to give reliable performance as well relative economy in construction. These can be validated further by implementing them in actual highway construction.

Annual TCDPAP International Workshop on
**SUSTAINABLE DEVELOPMENT AND POVERTY ALLEVIATION :
 CHALLENGES & OPPORTUNITIES FOR CONSULTANTS**

Dates : 28-30 November, 2002

Venue : Hanoi, Vietnam

PREAMBLE

Today, most countries face major social, economical, technological, political and institutional changes. This is particularly true with respect to the emerging countries of Asia, which are aspiring to leap-frog into the global mainstream. Globalisation and the regional and international economic integration resulting from this is focussing worldwide attention on sustainable development and poverty reduction.

Consulting Profession offers major support services towards sustainable development of the global economy. Technical consultants can play a significant role to accelerate the process with due attention being paid to project quality assurance and environmental protection. Being situated as they are in both developing and developed countries, technical consultants working in the Asia Pacific Region can build more appropriate models linking poverty alleviation to sustainable development, and in turn can influence worldwide efforts in this direction. Of course, there is no blueprint for building a country's poverty reduction strategy. Rather, the process should reflect a country's individual circumstances and characteristics.

OBJECTIVES

The proposed international workshop is expected to provide good opportunity for effective discussions and exchange of views and experience in updating information on consulting services and regional cooperation and upgrade technical, technological and managerial expertise in dealing with national projects as well as those of the ESCAP Region.

TOPICS TO BE COVERED

- Sustainable growth and poverty alleviation;
- Poverty and challenge for global community
- Poverty alleviation and long term sustainability
- Gaps between technological advance and human priorities

- Institutional setting for sustainable development
- Financing Sustainable Development
- Role of new technologies for poverty alleviation
- Technology and natural strategies against poverty (Vietnam)
- Technology for development : Domestic and global policies
- Poverty, Knowledge and information and technology
- Role of consultants, in context of Sustainable Development and Poverty Alleviation
- Regional cooperation among consultants for sustainable growth
- Challenges & Opportunities for Consultants
- Corporate Responsibility in 21st Century
- Energy and development for all in 21st Century

REGISTRATION FEE

For Full Participants

Registration Fee : US \$ 700.00
 Accompanying Person(s) : US \$ 200.00

The registration fee covers accommodation, food and local transportation, as well as the tours to the Hanoi City.

For Non-full Participants

Registration : US \$ 650.00
 Accompanying person(s) : US \$ 180.00

The registration fee covers accommodation, food and local transportation, etc.

For further details of the event, *please contact* -

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