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APPROPRIATE AUTOMATION PROMOTION PROGRAMME

DP/IND/82/034

INDIA

Technical Report

REVIEW OF THE APPROPRIATE AUTOMATION PROMOTION PROGRAMME  
AND RELATED AUTOMATION DEVELOPMENT ACTIVITIES IN INDIA

Prepared by  
Theodore J. Williams  
Consultant, UNIDO

456

Based on a Visit to India  
November 21 - December 19, 1986

SUMMARY

The author visited India on November 21-December 19, 1986 at the invitation of the Department of Electronics (DOE) of the Government of India (with the concurrence and support of the UNDP staff in New Delhi and UNIDO) to take part in the Seminar on Distributed Digital Control for Industrial Automation, as part of the India Trade Fair on November 25, 1986. The author also presented an extensive series of lectures at Bhilai, Rourkela and Ranchi as part of the INCOS (Integrated Control of Steel Plant) program of SAIL (Steel Authority of India, Limited) and the DOE, incorporated under the Appropriate Automation Promotion Program (AAPP), sponsored by UNIDO and UNDP with the DOE; and at Visakhapatnam at the new steel plant there.

He also visited the offices of SAIL to arrange for a continuation of SAIL's Summer Education Program with Purdue University set up to train participants in the INCOS Project. Continuation for the summer of 1987 was approved by SAIL. He also advised SAIL management on the near future activities of the INCOS Project.

OBJECTIVE

There were two major objectives for the visit to India on November 21-December 19, 1986. They were as follows:

1. To take part in the Seminar on Distributed Digital Control for Industrial Automation, of the India Trade Fair on Tuesday, November 25, 1986.
2. To present an extended series of lectures at Bhilai, Rourkela and Ranchi as part of the Integrated Control System for Steel Plant (INCOS) program of SAIL, and at Visakhapatnam at the new steel plant there.

The Seminar on Distributed Digital Control for Industrial Automation was one of a series of six seminars presented at the India International Trade Fair during the period of November 15-25, 1986. The program of the distributed control seminar is presented here as Appendix I. Approximately 100 individuals attended this seminar.

The program for the group of lectures presented for the personnel at the Visakhapatnam Steel Plant at Visakhapatnam, Orissa, is given in Appendix II. These lectures occurred on November 29, 1986 before an audience of over 150 of the plant engineers. They were very well received. Dr. Frederic J. Mowle, Professor of Electrical Engineering at Purdue University, accompanied the author to India on this visit and took part in this series of lectures.

Appendix III presents the schedule and list of attendees for the Special Engineers Training Program on INCOS held at

Bhilai Steel Plant on December 3-8, 1986. The author was also joined here by Professor F. J. Mowle of Purdue University in giving the lectures under this program. Note that 61 students from a large number of other steel plants and related industries in addition to Bhilai Steel Plant personnel were involved in this program.

The lectures at the Rourkela Steel Plant were presented solely by the author. These lectures were divided into two sets of presentations. The first was at the 12th Annual Convention of the Rourkela Chapter of the Computer Society of India on December 9. The second was a Workshop on Steel Plant Automation and Project Management held also at the Rourkela Steel Plant on December 9-10, 1986. The Workshop also included a Panel Discussion on the topic of "Need and Strategy of Computerisation in Rourkela Steel Plant".

A list of 30 attendees at the Workshop is also attached. Approximately 150 individuals attended the Computer Society of India Convention. See Appendix IV.

Appendix V presents the itinerary for the visit to Ranchi, State of Bihar, to visit Metallurgical Engineering Consultants, Ltd. (MECON) and the Research and Development Center of SAIL there and to present a series of lectures at MECON as noted in the itinerary. Thirty-five persons attended the lectures at MECON. Professor Mowle assisted in presenting these lectures as well.

While in New Delhi, the opportunity was taken to visit the headquarters of SAIL and arrange for a continuation of the Summer Education Program for SAIL engineers involved in the INCOS Project. The Program will be held at Purdue University during the period of May 18-August 14, 1987. A similar session will also be held at Case-Western Reserve University, Cleveland, Ohio. The program will duplicate the material presented last year in the similar program at that time.

A major internal discussion meeting on the appropriate methods of implementing the computer systems of the INCCS Project was held on Saturday, December 13, at SAIL Headquarters. It was chaired by the Chairman of SAIL, Mr. V. Krishnamurthy. At this meeting, an extensive discussion was held concerning the future of computer systems in SAIL. Mr. G. S. Varadan of DOE and the author were invited to this meeting. It was decided that work should be concentrated at Bhilai with work in other plants to be delayed until the success of the Bhilai project is assured, in fact, INCOS personnel at other plants were ordered to be transferred to Bhilai at least for the preparation of the Detailed Project Report by the Engineering Consultant Contractor. The author presented the list of recommendations documented in Appendix VI. Most of these were accepted by the personnel present at the meeting and endorsed by the Chairman of SAIL.

## FINDINGS AND CONCLUSIONS

Each visit to India by the author continues to demonstrate the enthusiasm with which the INCOS Project has been embraced by all Indian engineers involved in industrial control. This applies not only to the steel industry (principally SAIL) but also to all other industries as well. Those in other industries wish to know how such a project might also be initiated in their industries. The AAPP staff has initiated work to develop such programs in these other industries.

Thus the lectures presented by us during this visit were very well received by their audiences with many searching and very pertinent questions concerning the technology involved and the economic and sociological consequences of the type of control systems we were discussing.

As noted in previous reports by this author, all of this is having a profound effect upon the acceptance of automation by the Indian industry. In addition, as is also obvious, the political climate as developed by Prime Minister Gandhi's emphasis on modern technology has nourished the dreams of automation proponents. Likewise, the explosive development and acceptance of the computer in the outside world has only heightened the desire of the Indian engineer to be part of this rush of technology. The INCOS type of project has

furnished the medium by which such a participation can take place.

The current Appropriate Automation Promotion Programme of the Department of Electronics of the Government of India is scheduled to complete its five year period of sponsorship by UNIDO and the UNDP in May 1987. In view of the above it is imperative that means be found to extend the sponsorship of this project by the United Nations in order to continue to promote the beginning which has been so well initiated to date and to assure the eventual success of automation in Indian industry. It is understood that a two year extension of the project is possible per recent negotiations between DOE and UNDP. It is strongly recommended that such an extension be approved by the appropriate United Nations officials.

Concerning the INCO's Project itself, final negotiations for the Engineering Consultant Contractor to prepare the Detailed Project Report and the Detailed Estimate of Costs, for the project are now under way. It is expected that a contract will be forthcoming shortly with the result that these documents should be completed by the end of 1987. The five year development phase of the project should then begin with installation completed in 1992.



RECOMMENDATIONS

Based on the above observations the following recommendations are made to help the UNIDO and UNDP staffs in their continuing evaluation of the Appropriate Automation Promotion Programme and its accomplishments.

1. As noted above, it is imperative for continued progress on the Indian industrial automation scene that the AAPP be funded beyond its current expiration date of May 1987. As often noted on these pages in previous reports this programme has a reputation and acceptability in the eyes of Indian industry which is unique in this author's experience.
2. A two year extension has been suggested in conversations of which this writer has been a part. This would seem to be a minimum time for the AAPP to complete its task of educating Indian industrialists of the value of computer based automation for their production facilities.

3. As also noted previously, the INCOS Project should remain part of the AAPP. The very size and visibility of INCOS gives the AAPP a meaning far beyond that possible with all the other AAPP projects put together. Extending INCOS to other industries, as now planned, will enhance this factor even further.

APPENDIX I

SEMINAR ON DISTRIBUTED DIGITAL CONTROL FOR  
INDUSTRIAL AUTOMATION

India Trade Fair  
Delhi, India

November 25, 1986

9:30 AM - 10:00 AM		Registration of Delegates
10:00 AM - 10:15 AM		Welcome address by TFAI
10:15 AM - 10:30 AM	Chairman Address:	Shri K. Vasudevan, CMD, Instrumentation Ltd., Kota.
10:30 AM - 12:15 PM	Speakers:	<ol style="list-style-type: none"><li>1. Prof. T. J. Williams Purdue University, USA DDC FOR LARGE PROCESS PLANTS</li><li>2. Mr. G. S. Varadan, Department of Electronics DDC FOR STEEL PLANT</li><li>3. Dr. P. Purkayastha, Chief Engineer, Design, Greater Kailash Part-II, New Delhi, DDC FOR POWER PLANTS</li><li>4. Shri K. Chari, Manager, Engineer India Ltd., New Delhi DDC FOR OIL AND PETROLEUM REFINERIES</li><li>5. Shri V. Shukla, DGM Rashtriya Chemicals &amp; Fertilizer, Bombay DDC FOR FERTILIZER INDUSTRY</li></ol>

APPENDIX I (Cont.)

6. Shri A. K. Kaul  
Technical Manager,  
Electronic Corpn. of  
India,  
Hyderabad  
DDC FOR CEMENT PLANTS

12:15 PM - 12:45 PM

Discussion from the  
floor

12:45 PM - 12:55 PM

Summing up by Chairman

12:55 PM - 13:00 PM

Vote of thanks by TFAI

13:00 PM - 14:00 PM

Lunch

APPENDIX II

VISAKHAPATNAM STEEL PROJECT  
SYSTEMS DEPARTMENT

Visakhapatnam, Orissa, India

WORKSHOP ON STEEL PLANT AUTOMATION AND PROJECT MANAGEMENT

November 29, 1986

By Dr. T. J. Williams, Professor, Purdue University, USA  
Dr. F. J. Mowle, Professor, Purdue University, USA  
Mr. G. S. Varadar, DOE, Govt. Of India, New Delhi

PROGRAMME

9:30 AM	to	9:35 AM	INAUGURATION
9:35 AM	to	9:45 AM	"Appropriate Automation Promotion Programmes in Indian Steel Industry Co-ordinated by DOE," to be given by Mr. G. S. Varadan
9:45 AM	to	11:45 AM	"Hierarchical Computer Control System Over View With Detailed Treatment of the Duties at Each Level of the Hierarchy." by Prof. T. J. Williams
11:45 AM	to	12:00 Noon	Tea Break
12:00 Noon	to	1:00 PM	"Hierarchical Computer Control System Communications (Part 1) ISO/OSI Reference Model and Its Use in Standardisation Work." by Prof. F. J. Mowle
1:00 PM	to	2:00 PM	Lunch Break

APPENDIX II (Cont.)

2:00 PM	to	3:00 PM	"Hierarchical Computer Control Systems Communications (Part 2) Local Area Networks (LAN), Their Characteristics and Their Advantages, the MAP Communications Network," by Prof. F. J. Mowle
3:00 PM	to	3:15 PM	Tea Break
3:15 PM	to	5:15 PM	"Development of the Process Control Project; Planning and Implementation--Discussions of Important Considerations in Control System Project Management Timing, Planning, Personnel Requirements, Project Monitoring, Project Specifications, Systems Check Out and Testing, etc.," by Prof. T. J. Williams
5:15 PM	to	5:20 PM	Vote of Thanks

APPENDIX III

SPECIAL ENGINEERS TRAINING PROGRAM ON INCOS

Bhilai Steel Plant

Bhilai, Madhyar Pradesh

December 3-8, 1986

PROGRAMME - SCHEDULE

December 3, 1986

- 09:00 - 10:30 Programme Inauguration Presided over by:  
Shri K. R. Sangameswaran  
Managing Director, BSP  
Chief Guest:  
Dr. N. Seshagiri  
Addl. Secretary  
Electronics Commission
- 10:30 - 11:00 Tea Break
- 11:00 - 12:30 Overview of the )INCOS Group  
INCOS Project of ) of  
B.S.P. ) B.S.P.
- 12:30 - 14:00 Library Work and Discussion among participants and  
INCOS Group followed by Lunch
- 14:00 - 16:00 "Project Management for Computer Systems in Steel  
Industry"  
Prof. T. J. Williams
- 16:00 - 16:15 Tea Break
- 16:15 - 17:15 Discussions

APPENDIX III (Cont.)

December 4, 1986

09:00 - 11:00 "Software Management of Large Control System  
Project-I"  
Prof. F. J. Mowle

11:00 - 11:15 Tea Break

11:15 - 12:15 Discussions

12:15 - 14:00 Library, Laboratory and Discussion among  
participants followed by Lunch

14:00 - 16:00 "Reference Models for Computer Integrated  
Manufacturing"  
Prof. T. J. Williams

16:00 - 16:15 Tea Break

16:15 - 17:15 Discussions

December 5, 1986

09:00 - 11:00 "Software Management of Large Control System  
Projects-II - Analysis & Design"  
Prof. F. J. Mowle

11:00 - 11:15 Tea Break

11:15 - 12:15 Discussions

12:15 - 14:00 Library, Laboratory and Discussions among  
participants followed by Lunch

14:00 - 16:00 "Mathematical Modelling of Energy Intensive Plants  
(Soaking Pits and Reheating Furnaces)"

16:00 - 16:15 Tea Break

16:15 - 17:15 Discussions



APPENDIX III (Cont.)

December 6, 1986

- 09:00 - 11:00 "Software Management of Large Control System  
Projects-III - Implementation"  
Prof. F. J. Mowle
- 11:00 - 11:15 Tea Break
- 11:15 - 12:15 Discussions
- 12:15 - 14:00 Library, Laboratory and Discussion among  
participants followed by Lunch
- 14:00 - 16:00 "Mathematical Modelling of the Coke Oven  
Process-Heat Transfer and Energy Aspects"  
Prof. T. J. Williams
- 16:00 - 16:15 Tea Break
- 16:15 - 17:15 Discussions

December 8, 1986

- 08:30 - 10:30 "An Overview of Hierarchical Communication  
Networks Including the Latest Developments in Local  
Area Networks"  
Prof. F. J. Mowle
- 10:30 - 11:30 Valedictory Session

APPENDIX III (Cont.)

LIST OF PARTICIPANTS FOR SPECIAL

'INCOS INTERFACE GROUP'

Engineers Training Programme

December 3 - 8, 1986

<u>S.NO.</u>	<u>NAME</u>	<u>P.NO.</u>	<u>DESGN.</u>	<u>SECTION/DEPT./ORGN.</u>
1.	K.R. Chatterjee	4869	A.M.	Instn., BSP
2.	S. K. Sablok	199	Sr.RE	RDCIS,SAIL
3.	M.R. Khare	681	R.E.	RDCIS,SAIL
4.	R. K. Prasad	4639	A.M.	T&D Orgn.,BSP
5.	Chandan Rakshit	4436	A.M.	Telcom.,BSP
6.	Ali Hasan	4370	A.M.	PP II.BSP
7.	O.P. Sinha	5391	J.M.	CET,INCOS,BSP
8.	R.K. Sharma	455	Mgr.	BBM,BSP
9.	V.D. Chauhan	4007	Mgr.(E)	OHP,BSP
10.	Mukesh Kumar	5405	J.M.	CET,INCOS,BSP
11.	H.P. Das	50058	ADE	MECON,BHILAI
12.	Vijay Mairal	5279	J.M.	BF-7,BSP
13.	V. Brahmaji Rao	102387	APSA	System Dept., VSP
14.	G. Ramesh Chander	103975	J.M.	BF,VSP
15.	S.M. Chidambaram	102299	APSA	System Dept.,VSP
16.	T. Surendra	---	Sr.Tech.Off.	ECIL,Hyderabad
17.	V.S. Sudhav	---	Mgr.	ECIL,Hyderabad
18.	V. Nagaraju	---	Sr.Tech.Off.	ECIL,Hyderabad
19.	K. Somasekhara Rao	---	Sr.Tech.Off.	ECIL,Hyderabad
20.	V.K. Ghate	50487	Manager	CO&BPP,BSP
21.	B.S.Sinha	2679	D.M.	CO&BPP,BSP
22.	N.R. Rao	---	Mgr.	ECIL,Hyderabad
23.	M.S. Khandelwal	2450	Sr.SA	EDP.BSP
24.	R.N. Rakshit	2542	Sr.SA	EDP.BSP
25.	N.Mital	---	Sr.Sys.Engr.	CMC,Secunderabad
26.	V.K. Dhewan	2509	Mgr.	CO.BSP
27.	S.K. Rajadurai	---	Engr.	BHEL,ISG.Bangalore
28.	J.K. Mendiratta	---	Mgr.	BHEL,ISG.Bangalore
29.	Rajeev Verma	4346	A.M.	CCS.BSP
30.	Nagraj Rao	---	Mgr.	BHEL,ISG.Bangalore
31.	S.N. Agrawal	---	Sr.Mgr.	BHEL,ISG.Bangalore
32.	V.S. Sampat Kumar	2194	Mgr.	BF.BSP
33.	B.R. Bansal	2758	Mgr.	SMS.BSP
34.	S.V. Chandramouli	2998	D.M.	Instn.,BSP
35.	R.P. Kapoor	2991	D.M.	WRM.BSP

APPENDIX III (Cont.)

36.	V. Vijay	2601	Mgr.	WRM.BSP
37.	A. Narayanan	4895	J.M.	Instn.,BSP
38.	Mohinder Singh	---	AGM(Sys.)	MECON.Ranchi
39.	D.S. Arora	340216	Mgr.(EDP)	EDP.BSL.Bokaro
40.	T. Sathyamurty	---	AGM.(CO)	CO.VSP
41.	R. Sugavanam	4726	AM	Merchant Mill,BSP
42.	Harihar Rai	2904	Mgr.	Purchase, BSP
43.	R.N. Agrawal	52241	Mgr.	Plate Mill,BSP
44.	A.L. Dash	43909	A.M.	PCCD,RSP
45.	V. Avanchi	52573	Sr.DE	Instn.,MECON,Ranchi
46.	S.M. Tyagi	41433	A.M.	PCCD,RSP,SAIL
47.	I. Raghunath	---	Exe.Asst.to Chairman	Corporate Office,SAIL
48.	K.U. Selarka	131187	DE	Constn.,BSP
49.	P.K. Tiwari	132898	DE	Elect.Testing Zone,BSP
50.	N.P. Sharma	52292	ZE	-do- Constn..BSP
51.	Ashok Kanungo	52294	ZE	-do- Constn..BSP
52.	C. Vineet Rao	133032	DE	BF-7, Automation.Const., BSP
53.	N.K. Khurana	608	Mgr.	ETL,BSP
54.	Manoj Mehta	5354	J.M.	_____
55.	Y.S. Gupta	5035	J.M.	_____
56.	S. Bera	---	Sr.Spl.	_____
57.	P.B.Dutta	---	ZE	_____
58.	P. Kunhikannan	84319	D.M.	INCOS,BSP
59.	G.M. Arun Kumar	4747	A.M.	SP-II
60.	Panda	---	Dy.Mgr.	Nilachal Ispat Nigam, Bhubaneswar.Orissa
61.	K.C. Parija	---	Mgr(Govt.Serv.)	-do-



APPENDIX IV (Cont.)

Rourkela Steel Plant  
Rourkela, Orissa, India

WORKSHOP ON  
STEEL PLANT AUTOMATION & PROJECT MANAGEMENT"

Date: 9th and 10th December, 1986  
Venue: R&C Lab. Conference Hall/Training &  
Development Centre, Conference Room No. 2  
Organised by: INCOS Group and T& D Centre, RSP  
Lectures Presented by: Professor T. J. Williams,  
Purdue University

PROGRAMME

December 9, 1986 -- Venue: R&C Lab. CONFERENCE HALL

09:30 - 11:30 "Distributed Digital Control," (As a part of  
annual convention of CSI, Rourkela Chapter)  
  
Tea (Courtesy: CSI Rourkela Chapter)  
  
11:30 - 13:00 Technical Session No. I  
"Mathematical Modelling of Soaking Pit and  
Reheating Furnaces"  
  
Chairman - Shri Y.P. Sharma, DGM(Finishing)  
  
13:00 Departure for Training & Development Centre  
Conference Room No. 2

VENUE: TRAINING & DEVELOPMENT CENTRE  
CONFERENCE ROOM NO. 2

13:15 - 14:30 Working Lunch  
  
14:30 - 17:00 Technical Session No. II  
"Development of Process Control Project. Planning  
& Implementation"  
  
Chairman - Shri I. C. Modi, DGM (Modernisation)

APPENDIX IV (Cont.)

20:00 Dinner (Hosted by MD, RSP. at Ispat Hotel)

December 10, 1986 - VENUE: TRAINING & DEVELOPMENT CENTER  
CONFERENCE ROOM NO. 2

09:00 - 11:00 Technical Session No. III  
"Mathematical Modelling of BF Process"  
Chairman - Shri J. Mehra, DGM (Iron & Steel)

11:00 - 11:15 Tea

11:15 - 13:00 Technical Session No. IV  
"Mathematical Modelling of the Coke Oven Process"  
Chairman - Shri T.S.N. Murty, DGM (MS)

13:00 - 14:00 Working Lunch

14:30 - 15:30 Concluding Session - To be Chaired by GM(W)RSP  
Panel: DGM (I&S), DGM(FIN), DGM(MODRN), DGM(MS),  
Prof. Williams

APPENDIX IV (Cont.)

STEEL AUTHORITY OF INDIA LIMITED  
ROURKELA STEEL PLANT

WORKSHOP ON "STEEL PLANT AUTOMATION & PROJECT MANAGEMENT"

December 10, 1986 --- 2:30 PM

PANEL DISCUSSION & CONCLUSION

SUBJECT: "Need and Strategy of Computerisation  
in Rourkela Steel Plant"

PANEL MEMBERS: 1. Prof. T. J. Williams  
2. Shri I. C. Modi, D G M (Modrn)  
3. Shir Y P Sharma, D G M (Finish)  
4. Shri T S N Murthy, D G M (M S)  
5. Shri N M Nayak, A G M (Iron)

1. Introductory Remarks: Shir T S N Murthy,  
Dy. General Manager (M S)
2. Views From the Participants
3. Views From the Panel  
Members
4. Summing of the : Shri I C Modi  
Recommendations &  
Concluding Remarks Dy. General Manager (Modrn)
5. Vote of Thanks

APPENDIX IV (Cont.)

LIST OF PARTICIPANTS

1.	I.C. Modi	DGM(Modernisation)
2.	R.C. Pant	DGM(FP)
3.	U.K.S. Dighe	AGM(FIN-I)
4.	R.S. Gupta	AGM(Steel)
5.	N.M. Nayak	AGM(Iron)
6.	S.K. Jain	AGM(D&M)
7.	R.N. Das	CS(CO)
8.	K.S. Bhagavan	CS(EMD)
9.	S. Srinivasan	CS(HSM)
10.	A.K. Malhotra	CS(CRM)
11.	N. Dash	CS(Modernisation)
12.	P.B. Rao	CS(PP C)
13.	J.N. Bhambray	CS(R&C Lab.)
14.	T.P. Acharya	Addl.Supt.CO
15.	S.B.S. Lal	Supdt.Sint.Plant
16.	S.P. Mohanty	Supdt.SMS
17.	B.C. Mondal	Supdt.BSM
18.	A.K. Nayak	Supdt.PM
19.	J. Pandey	Manager, BF
20.	R.N. Chakravarty	Manager, Electronics Engg.
21.	D.R. Kar	Manager, Modernisation
22.	P.K. Mishra	Manager, Modernisation
23.	S.C. Sakuja	Manager, BSM
24.	S. Kar	Manager, CRM
25.	K. Krishnaswamy	Manager, EMD
26.	J.C. Mitra	Manager, EMD
27.	V.P. Srivastav	Manager, EDP
28.	S. Ramakrishnan	Dy.Mgr.FP(Instrumentation)
29.	B.K. Mishra	Asst.Manager. Training
30.	H.N. Purohit	Asst.Manager. PCCD



APPENDIX V

PROGRAMME OF VISIT TO MECON

Of

Prof. T. J. Williams & Prof. F. J. Mowle  
Purdue University, USA

and

Mr. G. S. Varadan of Dept. of Electronics  
Government of India

December 11, 1986

09:00 - 11:00	"Modelling of Thermal Processes - Soaking Pits and Reheat Furnaces"
	Professor T. J. Williams
11:00 - 11:30	Tea Break
11:30 - 13:30	"Modelling of the Blast Furnaces Process"
	Professor T. J. Williams
13:30 - 14:30	Lunch
14:30 - 14:45	Meet Director (M)
14:45 - 15:20 (Board Room)	Presentation of Audio Visual
15:20 - 15:30	Coal & Chemicals Division
15:30 - 15:40	Civil Engineering Dept.
15:40 - 16:00	RM & AED
16:00 - 16:15	Electrical Department
16:15 - 16:35	Computer Section
16:35 - 16:50	Model Room

APPENDIX V (Cont.)

METALLURGICAL AND ENGINEERING CONSULTS, LTD. (MECON)  
Ranchi, Bihar, India

LECTURE SCHEDULE OF PROF. T. J. WILLIAMS

and

PROF. F. J. MOWLE

Purdue University, USA

December 12, 1986

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PLACE	TIME	SCHEDULE
Venue: Third Floor Conference Hall MECON	09:00 - 10:30	"Computer Communication Network With Special Reference to MAP" Session-I  Professor F. J. Mowle
	10:30 - 10:45	Tea
	10:45 - 12:00	"Computer Communication Network With Special Reference to MAP" Session-II  Professor F. J. Mowle
	12:00 - 01:15	"Development of Process Control Project"  Professor T. J. Williams
	01:15 - 02:45	LUNCH
	02:45 - 04:00	"Software Project Management I"  Professor F. J. Mowle
	04:00 - 4:15	Tea

APPENDIX V (Cont.)

04:15 - 05:30 "Software Project Management  
II"

Professor F. J. Mowle

R and DC Complex 02:45 - 05:00 Visit to Research and  
Ranchi Development Center, Ranchi

Professor T. J. Williams

APPENDIX VI

RECOMMENDATIONS MADE TO THE

STEEL AUTHORITY OF INDIA, LIMITED

REGARDING THE

INTEGRATED CONTROL SYSTEM FOR STEEL PLANT PROJECT (INCOS)

CHAIRMAN'S MEETING

December 13, 1986

1. INCOS is a very large and a very difficult project. It will call for the concerted and cooperative effort of all concerned for its successful conclusion, not only at Bhilai but in succession at each of the other plants as well.
2. Your first and major requirement is for sufficient well trained personnel to plan, program, check-out, and install these systems in each plant - 125 is the number estimated for each one.
3. Each plant requires the establishment of a well thought out implementation plan, faithfully followed. The present program of a Prefeasibility Report followed by a more detailed Master Plan, and subsequently by the DPR (Detailed Project Report) and DEC (Definitive Estimated Costs) is the appropriate one.
4. Bhilai has been inaugurated as the first project. It must succeed! Work of a similar nature in other plants must be subordinated to it and new personnel concentrated there until a completely adequate staff is established. Only when success is assured at Bhilai should any significant work in other plants be initiated.
5. Any projects carried out at the other plants in the meantime should be small (first and second level unit process systems) and must be compatible with the future INCOS system to be installed there. Thus, each plant needs a Master Plan as soon as practical to assure this.

APPENDIX VI (Cont.)

6. Because of the great need for trained personnel, training must be carried out at the fastest speed possible, both here in India and abroad. Training is needed not only for development engineers and programmers, but also maintenance and operating technicians and operational personnel.
7. In addition to computer and instrumentation hardware and its associated software, your project needs detailed overall plant mathematical models for the development and simulation study of the needed production scheduling systems. Likewise, you need dynamic models of each of your production units for the carrying out of appropriate optimizations of unit economics and to develop the corresponding control systems, again through computer simulations. This work should start as soon as possible at Bhilai and must begin with a study of the availability of such models abroad to avoid unnecessary work here in India.
8. As you are aware many organizations around the world are ready and willing to help you in this large and very important task. An appropriately coordinated use of this help will certainly make your task much easier and assure your success.
9. Operational success of INCOS is going to demand a whole new "culture" in the management and operation of your plants; in the maintenance and cleanliness of the computer system and its associated components; in the repair of operational units; and in adherence to the production schedules formulated by the system. Otherwise, it becomes only an expensive toy. Incorporation and use of a computerized maintenance program into INCOS is strongly recommended, like that to be studied at Rourkela.
10. Standards are a vital part of the development of a project of the magnitude and extent of INCOS. It is imperative that the choice of the total list of appropriate standards be selected or developed for inclusion in the Bhilai DPR and used for all subsequent specification preparation and bid tendering for the project.