

## **ANNEX 2**

### Question's Data





# Dust Monitoring survey for Site Engineers/Officers

SI No	Name of the Surveyor	Location of the Survey	Date and Time of Survey	Name	Sex	Age	Educational Qualifications	Nature of Job	Organization Name	Total Working Experience at Construction site(Years)	Other Work Experience(Years)	Work Experience in Present site(Years)	Do you aware about the effect of dust ?	If yes do you know the impact of dust on health ?	How often have you attended dust monitoring and control	How often have you observed any health problem in your working site during safety monitoring and dust related incident/problem	If yes, What type of problem ?	If yes, How many times?	When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?		
1	SK Dhanraj	UGS Office	6-Jan-22 04:5	Male	31	Engineering	Site Engineer	SKDCL	1 year 11 months	0	0.5	Yes	Yes	Regularly	Never	Respiratory problem	No				When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?
2	SK Madan	UGS Office	6-Jan-22 05:0	Male	46	Engineering	Site Engineer	SKDCL	27 years	0	10 years	Yes	Yes	Regularly	Never	Respiratory problem	No				When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?
3	SK Raju	UGS Office	6-Jan-22 05:0	Male	34	Engineering	Site Engineer	SKDCL	2 years	0	10 years	Yes	Yes	Regularly	Never	Respiratory problem	No				When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?
4	SK Dhanraj	UGS Office	6-Jan-22 05:0	Male	32	Engineering	Site Engineer	SKDCL	2 years	0	10 years	Yes	Yes	Regularly	Never	Respiratory problem	No				When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?
5	SK Dhanraj	UGS Office	6-Jan-22 05:0	Male	33	Engineering	Site Engineer	SKDCL	2 years	0	10 years	Yes	Yes	Regularly	Never	Respiratory problem	No				When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?
6	SK Dhanraj	UGS Office	6-Jan-22 05:0	Male	32	Engineering	Site Engineer	SKDCL	2 years	0	10 years	Yes	Yes	Regularly	Never	Respiratory problem	No				When last problem occurred ?	Details about last health problem due to dust ?	How many times you have responded about the incident ?	Have you ever been taken dust control measurement at your limits ?	Do you think current dust control measures are enough ?	If so, pl. specify the method	If no, Have you prepared any improvement plan or method ?	If so, pl. specify method ?	Do you understand the purpose of Dust Monitoring method ?	Have you observed the dust concentration color panel during day ?	If yes, how often did you check in a day ?	Have you understand the meaning of dust color panel provided ?	Do you think that the dust monitoring method is sufficient for this site ?	If no suggest which kind method should be considered ?	Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method ?	By using dust monitoring method how much amount of saved or incident/problem can be controlled ?	Willingness to spend budget for dust monitoring and control for other/future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone ?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious ?	It yes, How much dust related controls you have followed by including mobile camera method ?	How would you rate use of dust monitoring method in construction ?	Will you recommend dust monitoring method for other ?

# Dust Monitoring survey for Site Engineers/Officers

Sl No	Name of the Surveyor	Location of the Survey	Date and Time of Survey	Personal Details							Safety Experience							On-Site Visualisation (OSV) Experience																																		
				Name	Sex	Age	Educational Qualifications	Name of Job	Organization Name	Total Working Experience at Construction site (Years)	Other Work Experience (Years)	Work Experience in Present site (Years)	Do you aware about the effect of dust?	If yes do you know the impact of dust on health?	How often have you attended dust monitoring and control programming?	How often have you faced/seen any dust related incident/problem during safety monitoring and health problem in your working site?	If yes, What type of problem?	If yes, How many times?	When last problem occurred?	Details about last health problem due to dust?	How many times you have responded about the incident?	Do you have any monitoring plans for the situation?	Have you ever been taken dust control measurement at your limits?	Do you think current dust control measures are enough?	If so, pl. specify the method.	If no, Have you prepared any improvement plan or method?	If so, pl. specify method?	Do you understand the purpose of Dust Monitoring method?	Have you observed the dust concentration color panel during a day?	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	If no suggest which kind method should be considered?	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	If yes suggest any method.	Do you agree this dust monitoring method will improve your attitude and health concerns?	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	How would you rate use of dust monitoring method in construction?	Will you recommend dust monitoring method for other												
1	1. A. K. Bhat	Miran Sionha	5 Jan 12 5:30 PM	Male	27	10th grade	Site engineer	SOMK	7.0	13 months	Yes	Yes	Some times	No	Health difficulty	3	Details about health problem due to dust?	Yes	Have you ever been taken dust control measurement at your limits?	Yes	Do you think current dust control measures are enough?	Yes	If so, pl. specify the method	None	If no, Have you prepared any improvement plan or method?	None	Do you understand the purpose of Dust Monitoring method?	Yes	Have you observed the dust concentration color panel during a day?	No	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	Yes	If no suggest which kind method should be considered?	None	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	Yes	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Medium	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Medium budget	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	No	If yes suggest any method.	None	Do you agree this dust monitoring method will improve your attitude and health concerns?	Yes	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	Poor	How would you rate use of dust monitoring method in construction?	Good	Will you recommend dust monitoring method for other	Yes
2	2. J. K. Bhat	Miran Sionha	5 Jan 12 5:30 PM	Male	24	Graduation	SA	SOMK	4.0	1.0	Yes	Yes	Some times	No	Health difficulty	3	Details about health problem due to dust?	Yes	Have you ever been taken dust control measurement at your limits?	Yes	Do you think current dust control measures are enough?	Yes	If so, pl. specify the method	None	If no, Have you prepared any improvement plan or method?	None	Do you understand the purpose of Dust Monitoring method?	Yes	Have you observed the dust concentration color panel during a day?	Yes	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	Yes	If no suggest which kind method should be considered?	None	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	Yes	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Medium budget	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Medium budget	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	No	If yes suggest any method.	None	Do you agree this dust monitoring method will improve your attitude and health concerns?	Yes	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	Good	How would you rate use of dust monitoring method in construction?	Good	Will you recommend dust monitoring method for other	Yes
3	3. K. Bhat	Miran Sionha	5 Jan 12 5:30 PM	Male	42	Graduation	SA	SOMK	20.0	2 months	Yes	Yes	Some times	No	Health difficulty	3	Details about health problem due to dust?	Yes	Have you ever been taken dust control measurement at your limits?	Yes	Do you think current dust control measures are enough?	Yes	If so, pl. specify the method	None	If no, Have you prepared any improvement plan or method?	None	Do you understand the purpose of Dust Monitoring method?	Yes	Have you observed the dust concentration color panel during a day?	Yes	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	Yes	If no suggest which kind method should be considered?	None	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	Yes	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Medium budget	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Medium budget	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	No	If yes suggest any method.	None	Do you agree this dust monitoring method will improve your attitude and health concerns?	Yes	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	Good	How would you rate use of dust monitoring method in construction?	Good	Will you recommend dust monitoring method for other	Yes
4	4. K. Bhat	Miran Sionha	5 Jan 12 5:30 PM	Male	27	Matric	Other	Other	1.5	1.5	Yes	Yes	Some times	No	Health difficulty	3	Details about health problem due to dust?	Yes	Have you ever been taken dust control measurement at your limits?	Yes	Do you think current dust control measures are enough?	Yes	If so, pl. specify the method	None	If no, Have you prepared any improvement plan or method?	None	Do you understand the purpose of Dust Monitoring method?	Yes	Have you observed the dust concentration color panel during a day?	Yes	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	Yes	If no suggest which kind method should be considered?	None	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	Yes	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Medium budget	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Medium budget	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	No	If yes suggest any method.	None	Do you agree this dust monitoring method will improve your attitude and health concerns?	Yes	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	Good	How would you rate use of dust monitoring method in construction?	Good	Will you recommend dust monitoring method for other	Yes
5	5. K. Bhat	Miran Sionha	5 Jan 12 5:30 PM	Male	24	Graduation	SA	SOMK	24.0	1.0	Yes	Yes	Some times	Yes	Health difficulty	3	Details about health problem due to dust?	Yes	Have you ever been taken dust control measurement at your limits?	No	Do you think current dust control measures are enough?	No	If so, pl. specify the method	None	If no, Have you prepared any improvement plan or method?	None	Do you understand the purpose of Dust Monitoring method?	Yes	Have you observed the dust concentration color panel during a day?	Yes	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	Yes	If no suggest which kind method should be considered?	None	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	Yes	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Significant	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Significant	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	Yes	If yes suggest any method.	None	Do you agree this dust monitoring method will improve your attitude and health concerns?	Yes	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	Good	How would you rate use of dust monitoring method in construction?	Good	Will you recommend dust monitoring method for other	Yes
6	6. K. Bhat	Miran Sionha	6 Jan 12 10:30 AM	Male	24	Graduation	Transport of GC	GC	20.0	Yes	Yes	Some times	No	Health difficulty	3	Details about health problem due to dust?	Yes	Have you ever been taken dust control measurement at your limits?	Yes	Do you think current dust control measures are enough?	Yes	If so, pl. specify the method	None	If no, Have you prepared any improvement plan or method?	None	Do you understand the purpose of Dust Monitoring method?	Yes	Have you observed the dust concentration color panel during a day?	Yes	If yes, how often did you check in dust color panel provided by you think the dust monitoring method is sufficient for this site?	Yes	If no suggest which kind method should be considered?	None	Do you think that problem occurred in the past could have been avoided if the site was using dust monitoring method?	Yes	By using dust monitoring method how much amount of severity of incident/problem can be controlled?	Significant	Willingness to spend budget for dust monitoring and control for other Future Metro constructions.	Significant	Do you have any idea on "Dust measurement and Monitoring" except present mobile phone?	Yes	If yes suggest any method.	None	Do you agree this dust monitoring method will improve your attitude and health concerns?	Yes	If yes, How much dust related concerns you have improved by introducing mobile camera by using dust monitoring method?	Good	How would you rate use of dust monitoring method in construction?	Very Good	Will you recommend dust monitoring method for other	Yes	

# Dust Monitoring survey for Road Users Infront of Central College Metro Station

SI.No	Name of the Surveyor	Location of the Survey	Date and Time of Survey	Personal Details			Safety Experience										Dust Monitoring (By Mobile Phone Camera)										
				Name	Sex	Age	Educational Qualifications	Nature of Job	Organization Name	Total Working Experience (Years)	Are you resident/road user near to the construction site?	Do you aware about the effect of dust?	If yes do you know the impact of dust on health?	Have you ever seen the dust related health problems due to metro construction?	Have you ever worried about your health and safety while passing near metro	How much health conscious do you have?	Are you aware of the dust monitoring at the BMRCC?	If Yes, have you enquired about it?	If yes, have undertaken meaning of color panel?	Have you undertaken the meaning of dust color panel?	Do you think that the color recorded at the work monitoring by mobile phone	If no suggest any improvement method?	Do you have any further ideas to you want to know any other information related to dust monitoring method will change	If agree, how much rate of improvement int health monitoring method in	How would you rate use of dust monitoring method for other		
1	Nehra B.S	52-Varanasi road	04/01/2012	Ball Punam K	Male	23	Graduate	Student	Govt. College K.	0.0	Yes	Yes	Yes	Yes	Very Often	No	No	No	Yes	No	Yes	Yes	Very good	Yes	Good	Fair	Yes
2	Nehra B.S	Road of CC	08/01/2012	Manoj B.S	Male	37	High School	Auto Driver		18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Very good	Yes	Very good	Very good	Yes
3	Nehra B.S	Road of CC	08/01/2012	Prakash	Male	37	High School	Owner		18	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Very good	Yes	Very good	Very good	Yes
4	Nehra B.S	Road of CC	08/01/2012	Prakash	Male	34	Graduate (LLB)	Owner		8.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Very good	Yes	Very good	Very good	Yes
5	Nehra B.S	Road of CC	08/01/2012	Singh G	Male	47	High School	Driver		25.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Very good	Yes	Very good	Fair	Yes
6	Nehra B.S	College ground	08/01/2012	M.S	Male	18	Student	Student	Govt Science College	20.0	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Very good	Yes	Good	Good	Yes
7	Nehra B.S	College ground	08/01/2012	M.S	Male	18	Student	Student	Govt Science College	20.0	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Very good	Yes	Good	Good	Yes
8	Nehra B.S	College ground	08/01/2012	Bhuvic	Male	19	Student	Student	Govt Science College	0.0	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Very good	Yes	Good	Good	Yes
9	Nehra B.S	College ground	08/01/2012	Anandh U	Male	20	Student	Student	Govt Science College	0.0	Yes	Yes	Yes	Yes	Very Often	Very good	No	No	Yes	Yes	Yes	Yes	Very good	Yes	Good	Good	Yes
10	Nehra B.S	College ground	08/01/2012	Sandeep K	Male	21	Graduate	Private Service		0.0	Yes	Yes	Yes	Yes	Often	Fair	Yes	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
11	Nehra B.S	College ground	08/01/2012	C.N.Hemphal	Male	21	Graduate		Govt college	4.0	Yes	Yes	Yes	Yes	Rarely	Fair	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
12	K.Durai	College ground	08/01/2012	Balu K	Male	22	Graduate		Govt college	4.0	Yes	Yes	Yes	Yes	Often	Good	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
13	K.Durai	College ground	08/01/2012	S.S	Female	18	Graduate		Govt college	0.0	Yes	Yes	No	No	Often	Good	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
14	K.Durai	College ground	08/01/2012	Chandrasekhar A	Male	21	Graduate		Govt college	0.0	Yes	Yes	No	No	Often	Good	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
15	K.Durai	College ground	08/01/2012	Chandrasekhar A	Male	21	Graduate		Govt college	0.0	Yes	Yes	No	No	Often	Good	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
16	K.Durai	College ground	08/01/2012	Deep Kumar	Male	21	Student		Govt art college	0.0	Yes	Yes	No	No	Often	Good	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
17	K.Durai	College ground	08/01/2012	Sandeep K	Male	21	Student		Govt art college	0.0	Yes	Yes	No	No	Often	Good	Yes	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes	
18	K.Durai	College ground	08/01/2012	B.S	Female	22	Graduate	Private Service		0.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
19	K.Durai	College ground	08/01/2012	Divyashree	Female	20	Graduate	Student	Govt college	0.0	Yes	Yes	No	No	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
20	K.Durai	College ground	08/01/2012	Kumar	Male	20	Graduate	Teacher	Govt college	0.0	Yes	Yes	No	No	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
21	K.Durai	College ground	08/01/2012	Prakash	Male	30	Graduate	Professional	Govt college	31	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
22	K.Durai	College ground	08/01/2012	Deep Kumar	Male	50	Master	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
23	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
24	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
25	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
26	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
27	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
28	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
29	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes
30	K.Durai	College ground	08/01/2012	Prakash	Male	47	High School	Professional	Govt Science College	25.0	Yes	Yes	Yes	Yes	Often	Fair	No	No	Yes	Yes	Yes	Yes	Good	Yes	Good	Good	Yes





















## Opinion Survey Data on OSV for Engineers/Officers at JV Office

Name of the Survey	Location of the Survey		Date and Time of Survey		Personal Details		Work Experience (in Years)		Safety Monitoring and Control Experience		Onsite Visualization(OSV) Experience	
	City	State	Month	Year	Age	Sex	Marital Status	Organization Name	Duration of OSV Experience	Frequency of OSV Use	OSV Software Used	OSV Hardware Used
JV	San Francisco	California	Mar	2023	35	Male	Single	10	10	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2
JV	San Francisco	California	Mar	2023	35	Male	Single	10	2	2	2	2



Personal Details	Safety Monitoring and Control Experience										On-site Visualization(OSV) Experience													
Name	Sex	Age	Educational Qualification	Nature of Job	Organization Name	Total working experience at organization (Months)	Total working experience at this office (Months)	How often have you attended safety induction programme	How many times you have responded?	Have you ever seen any improvement plans for the accident?	Do you think current safety control measures are enough?	If Yes, How often you make it a habit?	Have you observed the sensor during the work?	If Yes, How often you make it a habit?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?	Have you observed the sensor during the work?
19/04/2017																								
20/04/2017																								
21/04/2017																								



# Opinion Survey Data on OSV for Residents/Road User at BSNL Office

Name of the Surveyor		Date and Time of Survey	Name	Sex	Age	Educational Qualifications	Organization Name	Total work Experience(In Years)	Are you construction user near the construction site?	Have you ever seen the accident news about construction?	Have you worried about your bangle/door metro construction?	How much safety concerns do you have?	Have you observed the blue light on top of the HCL/MNL building?	If yes, how often you check in a day?	Have you found difficulty in observing the sensor?	If yes, provide the details, hard to identify or changes(from blue to green or yellow) in ordinary or day/night?	Do you get any sense of security by this?	If agree, can you explain the resident common man	Do you have any further ideas to know the safety condition except the light on the top of the building?	Do you agree this OSV will change your attitude and safety concerns?	If yes, How much safety concerns you have?	How would you rate of OSV in monitoring?	Will you recommend OSV monitoring method for other constructions?
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30









# ion Survey Data on OSV for Workers at Cricket Stadium Station (After Evacuation Training)

SINO	Name of the Surveyor	Location of the Survey	Date and Time of Survey	Personal Details			Safety Experience				On-Site Visualisation (OSV) Experience																								
				Name	Sex	Age	Educational Qualifications	Organization Name	Total Working Experience at Construction site(Years)	Other Work Experience(Years)	Work Experience in Present site(Years)	Have you ever undergone safety training programme?	How much safety conscious do you have?	How often have you faced safety incident during working at stadium?	Have you seen any accident or injury at your working site?	If yes, How many times?	Details about last incident?	How you responded about the incident?	Have you ever been prevented the accident (your control measures are Do you think current safety OSV)?	Do you understand the purpose of OSV method?	If Yes, how often did you check in a day?	Have you seen the "Changes of Color" in the sensor actions are require based on observing the color?	Have you found difficulty in identifying color?	Sensor should be based on audio visual system?	Do you think the numbers of sensors are sufficient for the sensors should be located?	If No, suggest which location accident/incident occurred?	What is Benefit of OSV Monitoring?	Can you specify the difference from normal Monitoring method will?	If yes, How much safety consciousness you have OSV in monitoring?	How would you rate use of OSV in monitoring?	Will you recommend OSV monitoring method for other				
1	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	46	Illiterate	Sub-contractor	6.0		3.0	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
2	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	22	Elementary School	Sub-contractor	1.2		1.0	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
3	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	21	High school	Sub-contractor	1.0		1.0	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
4	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	21	High school	Sub-contractor	1.2		1.0	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
5	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	21	Illiterate	Sub-contractor	1.0		1.0	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
6	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	23	Illiterate	Sub-contractor	1.0		1.0	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
7	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	20	Elementary School	Sub-contractor	4m		4m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
8	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	20	Illiterate	Sub-contractor	3y		8m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
9	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	35	Illiterate	Sub-contractor			20d		Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
10	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	22	High school	Sub-contractor			20d		Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
11	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	28	Elementary School	Sub-contractor			20d		Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
12	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	19	High school	Sub-contractor	4y		1y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
13	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	19	High school	Sub-contractor	3y		1y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
14	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	26	B.A.	Sub-contractor	1y		6m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
15	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	30	B.A.	OSVCC	2y		1y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
16	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	34	B.A.	OSVCC	5y		1y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
17	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	36	High school	Sub-contractor	17y		1m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
18	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	38	element	KELLER	14y		10m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Great	Yes
19	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	29	High school	Sub-contractor	4y		9m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
20	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	29	Illiterate	Sub-contractor	9y		9m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
21	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	32	High school	Sub-contractor	3y		1y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
22	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	38	High school	Sub-contractor	19y		1y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
23	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	20	Illiterate	Sub-contractor			7month	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
24	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	40	Illiterate	Sub-contractor	17y		1.2y	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
25	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	40	Elementary School	Sub-contractor	1m		1m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
26	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	19	High school	Sub-contractor	4m		4m	Elementary Good	Never	No	No				Yes	Yes	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
27	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	42	High school	SOMA	33y		6m	Elementary Good	Very often	No	No				Yes	Fair	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Good	Very Good	Yes
28	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male						3month	Fair	Never	No	No				Yes	Good	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Fair	great	Yes
29	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	32					3month	Fair	Never	No	No				Yes	Good	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Fair	great	Yes
30	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male	21	Intermediate				3month	Fair	Never	No	No				Yes	Fair	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Badter	great	Yes
31	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male						3month	Poor	Never	No	No				Yes	Poor	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Badter	great	Yes
32	Naveen Kumar	CS Cricket Stadium	5-Jan-22 10:30	Male						3month	Poor	Never	No	No				Yes	Fair	Sometimes	Yes	Yes	Daylight	No	No	more	Yes	Yes	Daylight	No	more	Yes	Badter	Very Good	Yes









# Opinion Survey Data on Dust Monitoring for the Participants of Training at IISC Bangalore

Personal Details				Work Experience				Dust Monitoring & Safety Exp.										Dust Monitoring Experience										
Sl.No	Name	Sex	Age	Educational Qualifications	Nature of Job.	Organization Name	Total Working Experience at Construction site(Years)	Other Work Experience(Years)	Work Experience at Present Work site(Years)	If Yes, do you know the impact of dust on health.	How often have you attended dust Monitoring and Control programming?	How often have you faced/scen any dust related incident/problem during safety health problem in your working site?	If Yes, What type of problem?	Do you think current dust control measures at construction site are enough?	If Yes, do you know about	If No, If so please specify the method	Do you understand the purpose of Dust Monitoring method?	Have you understand the meaning of dust color panel	Do you understand which actions are required based on change of Color?	Do you think that the dust monitoring method is sufficient?	Do you think that problem occurred in the past could have been avoided?	Will you recommend dust monitoring method for other workers?	Do you have any idea on "Dust Monitoring" measurement and Monitoring?	If yes suggest any method.	Do you agree this dust monitoring method will change your attitude and health conscious?	If Yes, How much dust related conscious you have improved by introducing mobile camera method?	How would you rate use of dust monitoring method in construction monitoring?	
1	Kashi Vishw Nath	Male	23	Master	Student	UVCE,Bangalore				Yes	Never	Sometime	Yes	Yes	Nose/Throat Irritation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Better	Good	
2	Jeevan George	Male	27	Master	Analyst	Feedback Consulting Group				No	Never	Sometime	Yes	No	Nose/Throat Irritation		Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Good	Very Good	
3	Raji M	Male	39	Master	freelady	College,Kadla,India				Yes	Sometime	Never	Yes	Yes	Breathing Difficulties		Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	Better	Good	
4	Sreelatha Kothiyasa	Female	36	Master	Student	IISC				Yes	Never	Sometime	Yes	Yes	Breathing Difficulties	Dust Guard	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Better	Good	
5	Chidambal	Male	23	Graduation	Student	UVCE,Bangalore				Yes	Never	Never	Yes	Yes	Breathing Difficulties		Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Fair	Fair	
6	shivaraj.N	Male	23	Graduation	Student	UVCE,Bangalore				Yes	Sometime	Sometime	Yes	Yes	Breathing Difficulties		Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Fair	Fair	
7	Shaina.Siva.S	Female	22	Master	Student	UVCE,Bangalore				Yes	Never	Sometime	Yes	Yes	Breathing Difficulties	Dust Guard	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Fair	Good	
8	Darshan.K.R	Male	23	Master (Phd year)	Student	IISC				Yes	Often	Often	Yes	Yes	eye Irritation		Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Better	Good	
9	Vemugala	Male	23	Master	Student	UVCE,Bangalore				Yes	Never	Sometime	Yes	Yes	Breathing difficulties		Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Better	Good	
10										Yes	Sometime	Never	Yes	Yes	Nose/Throat Irritation		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Good	Good	
11	G.K.Krupal	Male	48	Master	QA/QC	GC	22 years			Yes	Never	Sometime	Yes	Yes	Eye Irritation	Dust Guard	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Fair	Good	
12	Devraj.H	Male	25	Master	Student	IISC		1.5 years		Yes	Sometime	Often	Yes	Yes	Nose/Throat Irritation		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Better	Good	
13	Rajagayath.N	Male	27	Master	faculty	Fast West College		1 year		Yes	Sometime	Often	Yes	Yes	Nose/Throat Irritation		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Better	Good	
14	Dheepak.G.V	Male	26	Master	faculty	Dayanand Sagar College				Yes	Never	Sometime	Yes	Yes	Nose/Throat Irritation		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Better	Good	
15	Roshini.S.R	Female	25	Master (m.Tech)	Safety Officer	SOMA.I.V			3 months	Yes	Sometime	Sometime	No	Yes		Lack of knowledge to worker	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Better	Great	
16	Aashrithy	Female	24	Master	Student	IISC				Yes	Sometime	Never	Yes	Yes	Breathing Difficulty		Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Fair	Very Good	
17	Dr.M	Male	65	Ph.D.	faculty	IISC				Yes	Never	Sometime	Yes	Yes	Breathing Difficulty		Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Better	Fair	
18	Harith.M	Male	36	Doctoral	Prinsep	IISC			2 years	Yes	Sometime	Never	Yes	Yes	Breathing Difficulty	Water Spouting and Soil Compaction	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Better	Good
19	AN.Shiv.kumar	Male	46	Master	Site Engineer	Karnataka State Road Transport				Yes	Never	Often	Yes	Yes	Breathing Difficulty/Eye Irritation		Yes	No	No	No	Yes	Yes	Yes	Yes	Fair	Good		
20	Ishith.Kashyap	Male	23	Master	Student	IISC				Yes	Sometime	Often	Yes	Yes	Breathing Difficulty	Water Spouting and Soil Compaction	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Better	Good	
21	Ranjith.Kalyana	Male	23	Master	Student	IISC				Yes	Sometime	Often	Yes	Yes	Nose/Throat Irritation	Water Spouting and Soil Compaction	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Better	Good	
22	K.S.Madhiru	Female	28	Graduation		GC				Yes	Sometime	Sometime	Yes	No	Nose/Throat Irritation		Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Better	Good	
23	A.Gowri	Female	32			GC				Yes	Sometime	Sometime	Yes	Yes	Nose/Throat Irritation	BMC Control manual	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Fair	Good	



# Opinion Survey Data on OSV Monitoring for the Participants of Training at IISC Bangalore

Sl No	Personal Details				Work experience (in Years)				Safety Monitoring and Control Experience										On-Site Visualization OSV Method								
	Name	Sex	Age	Educational Qualifications	Nature of Job	Organization Name	Total working experience at construction site (years)	Total working experience at other works (years)	Total Working experience at Present Site	Do you know about safety monitoring at construction site?	Have you attended any safety induction programme?	Injury at any construction site	If Yes, provide details about seen incidents:	Do you think current safety control measure used in India were enough?	If yes, do you have any idea about following codes	If no, pl. specify the method you have seen:	Do you understand the purpose of OSV method?	Have you understand the concept of light emitting sensors used in OSV?	Do you understand which actions are required based on change of Color?	Do you think past accidents could have been happen at any construction site could have been avoided if the site had been monitored by OSV?	Express in your own words what is benefit of OSV Monitoring?	Can you specify the difference from normal monitoring	Is this OSV method useful as safety check for metro construction?	Do you agree this OSV monitoring method will change your attitude and safety consciousness?	If yes, how much safety consciousness you have improved:	Rate your opinion on OSV monitoring and control system:	
1	Karthikeyan	Male	21	Master	Student	IITCC Bangalore			Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Safe Color Technology	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
2	Dhruv	Male	25	Graduation	Student	Dynamat Mumbai		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Other	Can The Locking management	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Fair	Good	
3	Pranav	Male	21	Master	Student	IISc		Yes	Yes	Never	Yes	In Dark Bridge construction	Yes	Yes	Yes	Yes	Yes	Yes	Very Often	Safety	Work site safety	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good
4	Jayant	Male	27	Master	Research Assistant	Research Council of India		Yes	Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Visually very Beneficial	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
5	Ravi	Male	30	Master	Faculty	Govt College, Kerala		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple to understand	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
6	Shravan	Male	26	Master	Student	IISc		Yes	Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple to understand	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
7	Chandana	Female	23	Graduation	Student	LVCE Bangalore		Yes	Yes	Never	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
8	Ananya	Female	21	Graduation	Student	LVCE Bangalore		Yes	Yes	Sometimes	Yes	Minor	Yes	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
9	Shruti	Female	22	Master	Student	LVCE Bangalore		Yes	Yes	Sometimes	Yes	Minor	Yes	Yes	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
10	Arjun	Male	27	Graduation	Student	IITCC		No	No	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
11	Pranav	Male	27	Master	Student	IISc		No	No	Sometimes	Yes	Minor	Yes	Yes	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
12	Vishal	Male	23	Master	Student	LVCE Bangalore		Yes	Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
13	Adarsh	Female	25	Doctoral	Research Assistant	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
14	Adarsh	Male	48	Master	QA/QC	CC	22 years	Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
15	Pranav	Male	25	Master	Student	IISc		Yes	Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
16	Rishabh	Male	40	Master	Student	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
17	Pranav	Male	27	Master	Faculty	Govt College		Yes	Yes	Sometimes	Yes	Exhaustion	Yes	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
18	Pranav	Female	25	Master	Safety Officer	NQA IV	3 months	Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
19	Pranav	Male	26	Doctoral	PhD	IISc	2 years	Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
20	Pranav	Male	49	Graduation	Engineer	Govt	31	Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Very Often	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
21	Pranav	Male	46	Master	Site Engineer	CC	1.5 years	Yes	Yes	Never	Yes	Minor	Yes	No	Yes	Yes	Yes	Yes	Other	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
22	Pranav	Male	23	Master	Student	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
23	Pranav	Male	23	Master	Student	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
24	Pranav	Female	28	Graduation	English	CC		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
25	Pranav	Female	32	Master	Student	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Very Often	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
26	Pranav	Male	27	Doctoral	Student	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
27	Pranav	Male	23	Master	Student	IISc		Yes	Yes	Sometimes	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
28	Pranav	Male	24	Master	Student	LVCE Bangalore		Yes	Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Very Good	
29	Pranav	Male	22	Graduation	Student	IISc		No	No	Never	No	No	No	No	Yes	Yes	Yes	Yes	Some Time	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	
30	Pranav	Male	23	Master	Student	IISc		Yes	Yes	Never	No	No	No	No	Yes	Yes	Yes	Yes	Never	Simple & Efficient Method of Monitoring	Can you specify the difference from normal monitoring	Yes	Yes	Yes	Good	Good	

# Opinion Survey Data on OSV Monitoring for the Participants of Training at IISC Bangalore

Personel Details				Work experience (in Years)				Safety Monitoring and Control Experience				On -Site Visualization OSV Method								
Sl. No	Name	Gender	Qualification	Yes	No	Minor	Major	Yes	No	Minor	Major	Yes	No	Minor	Major	Yes	No	Minor	Major	
31	Manjunath KR	Male	Master Degree																	
32	Momah S	Male	M.Tech	Yes				Yes				Yes				Yes				Better
33	Shirya B.S	Male	Graduation	Yes				No				Yes				Yes				Better
34	Mranjan CHL	Male	Master Degree	Yes				Yes		Bad in to sleep		Yes				Yes				More easy and comprehensive
35	Shudini Narananah	Female	Master Degree	Yes				No		Minor		Yes				Yes				Fair
36	Kamshabata		Master Degree	Yes				No				Yes				Yes				Good
37	Shiva Prasad K	Male	Master Degree	Yes				No				Yes				No				Better
38	Hargh JHS	Male	Master Degree	Yes				No				Yes				Yes				Better
39	Anc Kumar Sharma	Male	Doctorate	Yes				No				Yes				Yes				Fair
40	Mohamesh Chougals	Male	Master Degree	Yes				Never				Yes				Yes				Fair



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**Japan International Cooperation Agency**

**June 2011 to January 2012**

**SET A: Opinion Survey on OSV for Site Engineers/Officers**

Name of the Surveyor:-----

Location of the Survey:-----Date of Survey:-----Time:-----

**1. Personal Details**

i) Name:-----

Sex: Male/Female

ii) Age:----- in years

iii) Educational Qualifications:-(a) Graduation (b) Master (c) Doctoral(d)Others (Specify)-----

iv) Nature of Job :- (a) Site Engineer(b) Safety Officer (c) SM (d) CPM/DyCPM(e) Others(Specify)-----

v) Organization:- (a) JICA (b) GC (c) DMRC (d)SOMA (e)Others Specify: -----

**2. Working Experience (in years)**

i) Total working experience: (a) at construction site----- (b) other works-----

ii) Working experience in present organization: (a) at construction site----- (b) other works-----

iii) Work experience at present site: -----



### 3. Safety Monitoring and Control Experience

- i) How often have you attended safety induction programme? : (a) Never (b)Some times (c) Often (d)Very often
- ii) How often have you faced/seen any safety incident problem during safety monitoring and control at site?: (a)Never(b) Some time (c) Often d) Very often

If so, pl. specify how many times:-----

#### A) If Safety Incident Problems were faced ( provide the following information)

- ❖ Have you met any accident or injury in your working Site (a) Yes (b) No

If Yes, provide the following Information

- ❖ How many times:----- When the last incident accrued ((a) within one month (b) One month (c) three month (d) Six months (e) beyond six months -----
- ❖ Details about last incident: (i) Minor (ii) Major, Specify-----
- ❖ How many times you have responded about the incident:  
(a)Never (b) Sometimes (c) Often (d) Very Often
- ❖ Have you done any improvement plans for the situation?:  
(a)Never (b) Sometimes (c) Often (d) Very Often
- ❖ Have you ever prevented the accident (your limits):  
(a)Never (b) Sometime (c) Often (d) Very Often

#### B) If Safety Incident Problem were not faced (provide the following information)

- ❖ Do you think current safety control measures are enough? (a) Yes (b) No
- ❖ If Yes, (a) Following safety code of Bureau of Indian Standards (BIS) (b) mechanized/automated methods (c) DM RC safety Manual (d) any other specify-----
- ❖ If No, Have you prepared any improvement plan or method: (a)Never(b) Sometimes (c)Often(d)Very Often
- ❖ If so pl. specify the method: -----

### 4. On-Site Visualization (OSV) Experience

- i) Do you understand the purpose of OSV method?: (a) Yes (b) No
- ii) Have you observed light emitting sensors during the work?: (a) Yes  
(b) No
- If Yes, how often you check OSV monitoring results utilizing the safety check sheet in a day?: (a) Rarely (b) Sometime (c) Often (d) Very Often
- iii) Have you seen the “Changes of Color” during the work?: (a) Yes (b) No
- iv) Do you understand which actions are required based on Change of Color? (a) Yes (b) No
- If yes, provided meanings of each color panel and counter measures/ actions required
- (a) Blue color: Meaning ----- Actions-----
- (b) Green Color: Meaning -----Actions-----
- (c) Red color: Meaning -----Actions-----
- v) Have you found difficulty in identifying the sensor color (a) Yes (b) No
- If yes, provide the following details
- ❖ Hard to identify color because of
    - (a) Day light (b) small size (c) not properly placed (d) Other Specify-----
  - ❖ Sensor should be based on (a) As existing with proper signal size (b) Interface with audio warning system (c) Interface with Dashboard message
- vi) Do you think the numbers of sensors are sufficient for this site?:
- (a) Not Sufficient (b) Sufficient (c) More than sufficient
- If Not Sufficient,
- ❖ Suggest which location the additional sensors should be installed: -----
  - ❖ How many additional sensors to be placed:-----
- vii) Would you like to share the OSV information with the public (a) Yes (b) No
- viii) Have you seen any accident happened during working site?:
- (a) Never (b) Sometime (c) Often (d) Very Often
- ix) Do you think that accident could have been avoided if the site was monitored by OSV?

(a)Never (b) Sometime (c) Often (d) Very Often

❖ If so, pl. specify how many times can be avoided-----

x) What is benefit of OSV Monitoring ? ----- Can You specify the difference from normal monitoring -----

xi) By using OSV safety monitoring method how much amount severity of incident (interims men and material) can be controlled?: (a)Negligible (b) Marginal (c) Significant (d) High (e) Very High

If Negligible, suggest any improvements in the present OSV monitoring method: -----

xii) Will you recommend OSV monitoring method as a tool for safety check for other /Future Metro constructions?: (a) Yes (b)No

xiii) Willingness to spend budget for OSV monitoring method other /Future Metro constructions:

(a) Nominal (b) Moderate budget (c) Sufficient Budget

xiv) Do you have any Ideas on “Safety Management” except OSV? (a) Yes (b) No

❖ If Yes, Suggest any method for Safety Management:-----

xv) Rate your awareness about the OSV safety monitoring and control system:

(a) Fair (b) Good (c) Very Good (d) Great (e) No Idea

xvi) Do you agree this OSV Monitoring method will change your attitude and safety conscious ? (a) Yes (b) No

If yes, How much safety conscious you have improved (a) No Improvement (b)Fair (c) better (d) Good

xvii)How would you rate use of OSV in construction safety monitoring and Control?

(a) Fair (b) Good (c) Very Good (d) Great



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**SET B: Opinion Survey on OSV for Workers**

Name of the Surveyor: \_\_\_\_\_

Location of the Survey: -----Date of Survey----- Time -----

**1. Personal Details**

i) Name:----- Sex: Male/Female

ii) Age:----- in years

iii) Educational Qualifications:- (a) Illiterate (b) Elementary School (c) High School (d) Intermediate (e) Others (Specify)

Organization : (a) Contractor(SOMA) (b) Sub-contractor

**2. Working Experience (in years)**

i) Total work experience: (a) at construction site----- (b) other works-----

ii) Work experience in present organization: (a) at construction site----- (b) other works-----

iii) Work experience at present site:----- (in months)

**3. Safety Experience (Historic/No OSV Case )**

- i) Have you ever undergone safety training programme ? : (a) Never (b) Sometimes (c) Often (d) Very often
- ii) How much safety consciousness do you have ? : (a) Poor (b) Fair (c) Good (d) Very Good
- iii) How often have you faced/seen safety incident problem during working at construction site?:  
(a) Never (b) Some times (c) Often (d) Very often

If so, pl. specify how many times:-----

**A) If you have faced/seen any safety issues (provide the following information)**

Have you seen any accident or injury at your working site ? (a) Yes (b) No

If yes, provide the following Information

- ❖ How many times:----- When did the last incident occurred ? (a) within one month (b) One month (c) three month (d) Six months (e) beyond six months -----
- ❖ Details about last incident: (i) Minor (ii) Major, Specify-----
- ❖ How you responded about the incident: (a) informed to team/officers (b) evacuated
- ❖ Have you planned to avoid incidents (a) Never (b) some times (c) Often (d) Very Often
- ❖ Have you ever been prevented the accident (your limits)?: (a) Never (b) Sometimes (c) Often (d) Very Often

**B) If you were not faced/seen any problem, provide the following Information**

- ❖ Do you think current safety control measures are enough?: (a) Yes (b) No
- ❖ If Yes, How are you satisfied with current measures (no OSV)?: (a) Fair (b) Good (c) Very Good
- ❖ If No, Have you prepared any improvement plan or method?:  
(a) Never (b) Sometimes (c) Often (d) Very Often
- ❖ If so, pl. specify the method: -----

**4. On-Site Visualization (OSV) Experience**

- i) Do you understand the purpose of OSV method?: (a) Yes (b) No
- ii) Have you observed light emitting sensors during the work?: (a) Yes (b) No
  - If Yes, how often did you check them in a day: (a) Rarely (b) Some times (c) Often (d) Very often
- iii) Have you seen the “Changes of Color” during the work?: (a) Yes (b) No
- iv) Do you understand which actions are required based on Change of Color? (a) Yes (b) No

If yes, provide meaning of each color panel and counter measures/ actions required

- (a) Blue color: Meaning ----- Actions-----
- (b) Green Color: Meaning -----Actions-----
- (c) Red color: Meaning -----Actions-----

- v) Have you found difficulty in observing the sensor (a) Yes (b) No

If yes, provide the following details

- ❖ Hard to identify color because of:
  - a (a) Day light (b) Small size (c) Not properly placed (d) Other Specify-----

- ❖ Sensor should be based on audio visual system (a) Yes (b) No

- vi) Do you think the number of sensors are sufficient for this site? (a) Yes (b) No

If No, suggest which location the sensors should be installed: -----

- vii) Have you seen any accident during working site?: (a) Yes (b) No

- viii) Do you think that accident/incident occurred in the past could have been avoided if the site was monitored by OSV?: (a) Yes (b) No

- ❖ If so, pl. specify how many times could those accidents be avoided-----

- ix) What is the benefit of OSV Monitoring ? ----- Can You specify the difference from normal monitoring -----

- x) Do you agree this OSV Monitoring method will change your attitude and safety conscious ? (a) Yes (b) No

If yes, How much safety consciousness you have improved (a) No Improvement (b) Fair (c) better (d) Good

- xi) How would you rate use of OSV in construction safety monitoring?
  - (a) Fair (b) Good (c) Very Good (d) Great

xii) Will you recommend OSV monitoring method for other /Future Metro constructions?: (a) Yes (b)No



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**SET C: Opinion Survey on OSV for Residents**

Name of the Surveyor: \_\_\_\_\_

Location of the Survey:-----Date of Survey:-----Time:-----

**1. Personal Details**

i) Name:-----

Sex: Male/Female

ii) Age:----- in years

iii) Educational Qualifications:- (a) Elementary School (b) High School (c) Graduate (d) Master (e) Others

(Specify)-----

iv) Nature of Job :- (a) Self Employ as Labor/ trader/Professional (b) Public Service(c) Private Service (d)

Others(Specify)-----

v) Organization Name:-----

vi) Total working experience(in years):-----

**2. Safety Awareness**



- i) Are you residents/road user near to the construction site?: (a) Yes (b) No
- ii) Have you ever seen the accident news about Bangalore metro construction?: (a) Yes (b)No
- iii) Have you ever worried about your safety while passing near Bangalore Metro Construction: (a) Rarely (b) Some times (c) Often (d) Very Often
- iv) How much safety conscious do you have: (a) Poor (b) Fair (c) Good (d) Very Good

**3. On-Site Visualization (OSV)**

- i) Have you observed the blue light on top of the building?: (a) Yes (b) No
  - If Yes, have you enquired about it?: (a) Yes (b) No
  - If Yes, how often you check in a day?: (a) Rarely (b) Some times (c) Often(d) Very Often
- ii) Have you found difficulty in observing the color (a) Yes (b) No

If yes, provide the following details

- ❖ Hard to identify color because of
  - (a) Day light (b) Small size (c) not properly placed (d) Other Specify-----
- ❖ Sensor should be based on audio visual system (a) Yes (b) No

- iii) Have you seen any color changes (from blue to green or yellow) in the ordinary day/night?: (a) Yes (b) No

If No means, same color indicates there is nothing so trouble,

- Do you get any sense of security by this? (a) Agree (b) Disagree
- If Agree, can you explain feel of your security as a resident/ common man (a) Little (c) Comfortable (d) Very Comfortable (d) Can't explain

- iv) Do you have any further ideas to know the safety condition except the light on the top of the building? (a)No Idea(b) light at the entrance (b) Dash board messages (a) Audio messages (b) other Specify:-----
- v) Do you want to know any other information related to : (a) construction (b) Safety/OSV(c)Others

vi) Do you agree this OSV Monitoring method will change your attitude and safety conscious ? (a) Yes (b)

No

If yes, How much safety conscious you have improved (a) No Improvement (b)Fair (c) better (d) Good

vii) How would you rate use of OSV in construction safety monitoring?

(a) Fair

(b) Good

(c) Very Good

(d) Great

viii) Will you recommend OSV monitoring method for other /Future Metro constructions?: (a) Yes (b)No



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**SET A: Dust Monitoring Survey for Site Engineers/Officers**

Name of the Surveyor:-----

Location of the Survey:-----Date of Survey:-----Time:-----

**1. Personal Details**

i) Name:-----

Sex: Male/Female

ii) Age:----- in years

iii) Educational Qualifications:-(a) Graduation (b) Master (c) Doctoral(d)Others (Specify)-----

iv) Nature of Job :- (a) Site Engineer(b) Safety Officer (c) SM (d) CPM/DyCPM(e) Others(Specify)-----

v) Organization:- (a) JICA (b) GC (c) BMRC (d)SOMA (e) Others Specify:-----

**2. Working Experience (in years)**

i) Total working experience: (a) at construction site----- (b) other works-----

ii) Working experience in present organization: (a) at construction site----- (b) other works-----

iii) Work experience at present site: -----

### 3. Dust Monitoring and Control Experience

- i) Do you aware about effect of dust (a) yes (b) no ; If yes do you know the impact of dust on health  
yes/ no
- ii) How often have you attended dust Monitoring and Control programme? : (a) Never (b)Some times (c)  
Often (d)Very often
- iii) How often have you faced/seen any dust related incident/ problem during safety monitoring and control  
at site?: (a)Never(b) Some time (c) Often d) Very often

If so, pl. specify how many times:-----

#### A) If Dust related Problems were faced ( provide the following information)

- ❖ Have you met any dust related health problem in your working Site (a) Yes (b) No

If yes, provide the following Information

- ❖ What Type problem (a) Breathing difficulties (b) Nose/Throat Irritation (c) Eye Irritation (d) any other  
specify

If Yes, provide the following Information

- ❖ How many times:----- When the last problem occurred (a) one week (b) Fortnight (c) month  
(d) one year
- ❖ Details about last health problem due to dust : (i) Minor (ii) Major, Specify-----
- ❖ How many times you have responded about the incident:  
(a)Never (b) Sometimes (c) Often (d) Very Often
- ❖ Have you done any improvement plans for the situation?:  
(a)Never (b) Sometimes (c) Often (d) Very Often
- ❖ Have you ever been taken dust control measurements at your limits:  
(a)Never (b) Sometime (c) Often (d) Very Often

#### B) If Dust Related Problem were not faced (provide the following information)

- ❖ Do you think current dust control measures are enough? (a) Yes (b) No
- ❖ If Yes, (a) Following safety code of Central Pollution Control Board (CPCB) (b) DM RC Dust  
Control Manual (c) Water Spraying and Soil Compaction (d) Dust Guard (e) any other specify-----

❖ If No, Have you prepared any improvement plan or method: (a)Never(b) Sometimes  
(c)Often(d)Very Often

❖ If so pl. specify the method: -----

#### 4. Dust Monitoring Experience

i) Do you understand the purpose of Dust Monitoring method?: (a) Yes (b) No

ii) Have you observed the dust concentration color panels during the work?: (a) Yes (b) No

▪ If Yes, how often did you check in a day: (a) Rarely (b) Some times (c) Often (d) Very often

iii) Have you understand the meaning of dust color panel color provided at the work?: (a) Yes (b) No

If yes, provided meaning of each color panel and counter measures/ actions are required

(a) Blue color: Meaning ----- Actions-----

(b) Yellow Color: Meaning -----Actions-----

(c) Red color: Meaning -----Actions-----

iv) Do you think that the dust monitoring method is sufficient for this site? (a) Yes (b)

No

If No, suggest which kind method should be considered: -----

v) Have you seen any dust problem facing during working site?: (a) Yes (b) No

vi) Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method?: (a) Yes (b) No

❖ If so, pl. specify how many times can be avoided-----

vii) Would you like to share the Dust Monitoring information with the public (a) Yes (b)No

viii) By using dust monitoring method how much amount of severity of incident/problem (interims men and material) can be controlled?: (a)Negligible (b) Marginal (c) Significant (d) High (e) Very High

If Negligible, suggest any improvements in the present dust mobile photo monitoring method: -----

ix) Will you recommend dust monitoring method for other /Future Metro constructions?: (a) Yes (b)No

x) Willingness to spend budget for dust monitoring and control for other /Future Metro constructions:

(a) Nominal (b) Moderate budget (c) Sufficient Budget

xi) Do you have any Ideas on “Dust Measurement and Monitoring” except present mobile phone camera method? (a) Yes (b) No

❖ If Yes, Suggest any method:-----

xii) Do you agree this dust monitoring method will change your attitude and health conscious?  
(a) yes (b) No; If yes, how much dust related conscious you have improved by introducing mobile camera method? (a) No Improvement (b) Fair (c) better (d) Good

xiii) How would you rate use of dust monitoring method in construction monitoring?  
(a) Fair (b) Good (c) Very Good (d) Great

xiv) Will you recommend Dust monitoring method for other /Future Metro constructions?: (a) Yes  
(b)No



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**SET B: Dust Monitoring Survey for Workers**

Name of the Surveyor: -----

Location of the Survey-----Date of Survey-----Time-----

**1. Personal Details**

- i) Name:----- Sex: Male/Female-----
- ii) Age:----- in years
- iii) Educational Qualifications:- (a) Illiterate (b) Elementary School (c) High School (d) Intermediate (e) Others (Specify)
- iv) Organization : (a) Contractor----- (b) Sub-contractor-----

**2. Working Experience (in years)**

- i) Total work experience: (a) at construction site----- (b) other works-----
- ii) Work experience in present organization: (a) at construction site----- (b) other works-----
- iii) Work experience at present site:----- (in months)

**3. Awareness of Dust (No Dust Monitoring Case )**

- i) Do you aware about effect of dust (a) yes (b) no ; If yes do you know the impact of dust on health yes/ no
- ii) Have you ever under gone dust precautionary training programme :(a) Never (b) Sometimes (c) Often

- iii) How much conscious on dust do you have during working at site: (a) Poor (b) Fair (c) Good (d) Very Good
- iv) Have You faced any dust allergy/ problems during working (a) yes (b) no ; If yes how often have you faced dust related problem during working at construction site?:

If so, pl. specify how many times: -----

**A) If you have faced any Dust related Problems (provide the following information)**

Have you met any health related problems at your working site due to dust (a) Yes (b) No

If yes, provide the following Information

- ❖ What type problem (a) Breathing difficulties (b) Nose/Throat Irritation (c) Eye Irritation (d) any other specify  
How many times: ----- When was the last incident/problem occurred (a) one week (b) Fortnight (c) month  
(d) one year (e) beyond one year -----
- ❖ How you responded about the problem: (a) informed to team/officers(b) Taken your own precautions
- ❖ Have you planed to avoid to work during high dust situation due to reduction in visibility (a)Never(b) some times  
(c) Often (d) Very Often
- ❖ Have you ever suggested to your co-worker to take precautions during working in Dust?: (a)Never (b) Sometimes(c) Often (d) Very Often

**B) If you were not faced/seen any problem, provide the following Information**

- ❖ Do you think current dust related safety measures are enough?: (a) Yes (b) No
- ❖ If Yes, How you satisfied with current dust related measures (no Dust Monitoring)?:  
(a) Fair (b) Good (c) Very Good
- ❖ If No, Have you prepared any precautionary method to work during construction?:  
(a)Never (b) Sometimes(c) Often (d) Very Often
- ❖ If so, pl. specify the method: -----

**4. Dust Monitoring Experience (by Mobile Phone camera)**

- i) Do you understand the purpose of dust monitoring method?: (a) Yes (b) No
- ii) Have you observed the dust concentration color panels?: (a) Yes (b) No
  - If Yes, how often did you check in a day: (a) Rarely (b) Some times (c) Often (d) Very often
- iii) Have you understand the meaning of dust color panel color provided at the work?: (a) Yes (b) No

If yes, provided meaning of each color panel and counter measures/ actions are required

- (a) Blue color: Meaning ----- Actions-----
- (b) Yellow Color: Meaning -----Actions-----
- (c) Red color: Meaning -----Actions-----



iv) Do you think that the present dust monitoring method is sufficient for this site? (a) Yes (b) No

If No, suggest which kind method should be considered: -----

v) Have you seen any dust problem facing during working site?: (a) Yes (b) No

vi) Do you think that problem occurred in the past could have been avoided if the site was monitored and controlled by dust measurement method?: (a) Yes (b) No

❖ If so, pl. specify how many times can be avoided-----

vii) Do you agree this dust monitoring method will change your attitude and health conscious? (a) Yes (b) No

If agree, how much rate of improvement in health conscious by introducing Dust Monitoring Method?

(a) No Improvement (b) Fair (c) better (d) Good

viii) How would you rate use of Dust Monitoring in construction safety monitoring?

(a) Fair (b) Good (c) Very Good (d) Great

ix) Will you recommend dust monitoring method for other /Future Metro or Road constructions?: (a) Yes (b) No



**Special Assistance for Project Implementation (SAPI) applying  
On Site Visualization and Dust Monitoring at Bangalore Metro construction sites**

**SAPI for Bangalore Metro Project utilizing Japanese ODA  
Japan International Cooperation Agency  
June 2011 to January 2012**

**SET C: Dust Monitoring Survey for Road User**

Name of the Surveyor:-----

Location of the Survey:-----Date of Survey:-----Time:-----

**1. Personal Details**

- i) Name:----- Sex: Male/Female
- ii) Age:----- in years
- iii) Educational Qualifications:- (a) Elementary School (b) High School (c) Graduate (d) Master (e) Others  
(Specify)-----
- iv) Nature of Job :- (a) Self Employ as Labor/ trader/Professional (b) Public Service(c) Private Service (d)  
Others(Specify)-----
- v) Organization Name:-----
- vi) Total working experience(in years):-----

**2. Dust Awareness**

- i) Are you residents/road user near to the construction site?: (a) Yes (b) No
- ii) Do you aware about effect of dust (a) yes (b) no ; If yes do you know the impact of dust on health  
yes/ no

- iii) Have you ever seen the dust related health problems due to metro construction?: (a) Yes (b)No
- iv) Have you ever worried about your health and safety while passing near Metro Construction: (a) Rarely (b) Some times (c) Often (d) Very Often
- v) How much health conscious do you have: (a) Poor (b) Fair (c) Good (d) Very Good

**3. Dust Monitoring (by Mobile Phone Camera)**

- i) Are You aware of the dust monitoring at the construction site?: (a) Yes (b) No
  - If Yes, have you enquired about it?: (a) Yes (b) No
  - If Yes, have understand the meaning of color panel?: (a) Rarely (b) Some times (c) Often(d) Very Often
- ii) Have you understand the meaning of each color panel (a) Yes (b) No
- iii) Have you understand the meaning of dust color panel color provided at the work?: (a) Yes (b) No

If yes, provided meaning of each color panel and counter measures/ actions are required

- (a) Blue color: Meaning ----- Actions-----
- (b) Yellow Color: Meaning -----Actions-----
- (c) Red color: Meaning -----Actions-----

- iv) Do You think the dust monitoring by mobile phone camera is beneficial?: (a) Yes (b) No

If No, suggest any improvement method: -----

- v) Do you have any further ideas to know the dust measurement condition except using mobile phone?
  - (a)No Idea(b) Color Panel at entrance (c) Dash Boar Messages (a) Audio messages (b) other Specify:--
- vi) Do you want to know any other information related to : (a) construction (b) Dust control measures (c)Others
- vii) Do you agree this dust monitoring method will change your attitude and health conscious?
  - (a) yes (b) No; If yes, how much dust related conscious you have improved by introducing mobile camera method? (a) No Improvement (b) Fair (c) better (d) Good
- viii) How would you rate use of dust monitoring method in construction monitoring?
  - (a) Fair (b) Good (c) Very Good (d) Great

ix) Will you recommend Dust monitoring method for other /Future Metro constructions?: (a) Yes (b)No

## **Opinion Survey on OSV for Participants of Workshop**

### **1. Personal Details**

- i) Name: \_\_\_\_\_ Sex: Male/Female Age: \_\_\_\_\_ in years  
ii) Educational Qualifications:-(a) Graduation (b) Master (c) Doctoral(d)Others (Specify) \_\_\_\_\_  
iii) Nature of Job :- (a) Site Engineer(b) Safety Officer (c) SM (d) CPM/DyCPM(e) Faculty (f)Students  
iv) Organization:- (a) JICA (b) GC (c) BMRC (d)SOMA (e)IISc (f) Others Specify: \_\_\_\_\_

### **2. Working Experience (in years)**

- i) Total working experience: (a) at construction site: \_\_\_\_ (b) other works: \_\_\_\_ (c) at present site: \_\_\_\_\_

### **3. Safety Monitoring Awareness**

- i) How often have you attended safety induction programme? : (a) Never (b)Some times (c) Often  
ii) How often have you seen any safety incident problem at site?: (a)Never(b) Some time (c) Often

#### **A) If Safety Incident Problems were seen ( provide the following information)**

- ❖ Have you met any accident or injury in your working Site (a) Yes (b) No If Yes, provide details about last incident: (i) Minor (ii) Major, Specify: \_\_\_\_\_

#### **B) If Safety Incident Problem were not faced (provide the following information)**

- ❖ Do you think current safety control measures are enough? (a) Yes (b) No  
❖ If Yes, (a) Following safety code of Bureau of Indian Standards (BIS) (b) mechanized/automated methods (c) BMRC safety Manual If No, pl. specify the method: \_\_\_\_\_

### **4. On-Site Visualization (OSV) Experience**

- i) Do you understand the purpose of OSV method?: (a) Yes (b) No  
ii) Have you observed light emitting sensors during the work?: (a) Yes (b) No  
iii) Have you seen the “Changes of Color” during the work?: (a) Yes (b) No  
iv) Do you understand which actions are required based on Change of Color? ( a) Yes (b) No  
v) Do you think accident could have been happen at construction avoided if the site was monitored by OSV? (a)Never (b) Sometime (c) Often (d) Very Often  
vi) What is benefit of OSV Monitoring? ----- Can You specify the difference from normal monitoring -----  
vii) By using OSV safety monitoring method how much amount severity of incident (interims men and material) can be controlled?: (a)Negligible (b) Marginal (c) Significant (d) High (e) Very High  
viii) Will you recommend OSV method for safety check for other metro constructions?: (a) Yes (b)No  
ix) Rate your opinion on OSV Training programme on safety monitoring and control system:  
(a) Fair (b) Good (c) Very Good (d) Great (e) No Idea  
x) Do you agree this OSV monitoring method will change your attitude and safety conscious? (a) Yes (b) No If yes, How much safety conscious you have improved (a) No Improvement (b)Fair (c) better (d) Good  
xi) How would you rate use of OSV method in construction safety monitoring and Control?

(a) Fair

(b) Good

(c) Very Good

(d) Great



## **Opinion Survey on Dust Monitoring for Participants of Workshop**

### **1. Personal Details**

- i) Name: \_\_\_\_\_ Sex: Male/Female Age: \_\_\_\_\_ in years
- ii) Educational Qualifications:- (a) Graduation (b) Master (c) Doctoral (d) Others (Specify) \_\_\_\_\_
- iii) Nature of Job :- (a) Site Engineer (b) Safety Officer (c) SM (d) CPM/DyCPM (e) Faculty (f) Students
- iv) Organization:- (a) JICA (b) GC (c) BMRC (d) SOMA (e) IISc (f) Others Specify: \_\_\_\_\_

### **2. Working Experience (in years)**

- i) Total working experience: (a) at construction site: \_\_\_\_ (b) other works: \_\_\_\_ (c) at present site: \_\_\_\_\_

### **3. Dust Monitoring and Control Experience**

- i) Do you aware about effect of dust (a) yes (b) no ; If yes do you know the impact of dust on health yes/ no
- ii) How often have you attended dust Monitoring and Control programme? : (a) Never (b) Some times (c) Often
- iii) How often have you seen any dust related incident/ problem during safety monitoring and control at site?: (a) Never (b) Some time (c) Often

#### **A) If Dust related Problems were seen ( provide the following information)**

- ❖ Have you seen any dust related health problem (a) Yes (b) No If yes, provide the following Information
- ❖ What Type problem (a) Breathing difficulties (b) Nose/Throat Irritation (c) Eye Irritation (d) any other specify
- ❖ Have you done any improvement plans for the situation?: (a) Never (b) Sometimes (c) Often

#### **B) If Dust Related Problem were not faced (provide the following information)**

- ❖ Do you think current dust control measures are enough? (a) Yes (b) No
- ❖ If Yes, (a) Following safety code of Central Pollution Control Board (CPCB) (b) BM RC Dust Control Manual (c) Water Spraying and Soil Compaction (d) Dust Guard (e) any other specify-----  
If No, If so pl. specify the method: -----

### **4. Dust Monitoring Experience**

- i) Do you understand the purpose of Dust Monitoring method?: (a) Yes (b) No
- ii) Have you understand the meaning of dust color panel (a) Yes (b) No
- iii) Do you think that the dust monitoring method is sufficient? (a) Yes (b) No
- iv) Have you seen any dust problem facing during any working site?: (a) Yes (b) No
- v) Do you think that problem occurred in the past could have been avoided if the site was monitored by present dust measurement method?: (a) Yes (b) No
- vi) Will you recommend dust monitoring method for other Metro constructions?: (a) Yes (b) No
- vii) Do you have any Ideas on “Dust Measurement and Monitoring” except present mobile phone camera method? (a) Yes (b) No If Yes, Suggest any method:-----
- viii) Do you agree this dust monitoring method will change your attitude and health conscious? (a) yes (b) No; If yes, how much dust related conscious you have improved? (a) No Improvement (b) Fair (c) better (d) Good
- ix) How would you rate use of dust monitoring method in construction monitoring?

Opinion Survey on Dust Monitoring during Training Programme on the On-Site Visualization and Dust  
Monitoring on Bangalore Metro Project

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(a) Fair (b) Good (c) Very Good (d) Great



## **ANNEX 3**

### Documents for Training Program and Final Workshop



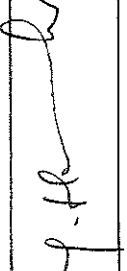

(Pamphlet of OSV&DUST Monitoring, Attendance  
List, Program)






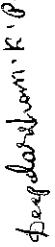


**Attendance list for the Workshop**








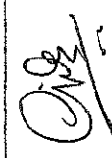
No.	Category	Institute	✓	Name	Position	Email
1	JICA	JICA	✓	Mr. Yamanaka	Chief representative of JICA, India	yamanaka.shinichi@jica.go.jp
2			✓	Mr. Sano	Representative	sano.yuichiro@jica.go.jp
3			✓	Mr. Singh	Principal Development Specialist	singhmahendrapal@jica.go.jp
4			✓	Mr Sanjeev	Lead Development Specialist	moholkarsanjeev.id@jica.go.jp
5			✓	Mr. Suman Das Gupta	Senior Program Manager, Bangladesh	dasgupta.lg@gmail.com
6	Railway	Bangalore Metro Rail Corporation Ltd. (BMRCL)	✓	Mr. Sivasailam	MD	nsivasailam@gmail.com
7			✓	Mr. Sudhir Chandra	Director (P & P)	sudhirchandra@bmrcl.co.in
8			✓	Mr. Pahuja.D.D.	Director (RSE, O&M)	pahuja@bmrcl.co.in
9			✓	Mr. Shivananda K R	Deputy Chief Engineer	shivananda@bmrcl.co.in
10			✓	Mr. B.L. Y. Chavan	Chief Engineer Electrical (RS)	chavan@bmrcl.co.in
11			✓	Mr. N. P. Sharma	Chief Engineer (D&C)	sharmanp@bmrcl.co.in
12			✓	Mr. Guduge	Deputy Chief Engineer	guduge@bmrcl.co.in
13			✓	Mr. Dayanda Shetty	Deputy Chief Engineer (UG-1)	dayanandshetty@bmrcl.co.in
14			✓	Mr. Doddihal	Chief Engineer (R4)	doddihal@bmrcl.co.in
15			✓	Mr. S.S. Hegaraddi	Chief Engineer	hegaraddi@bmrcl.co.in
16			✓	Mr. P.N. Nayak	Chief Engineer	pnnayak@bmrcl.co.in
17			✓	Mr. Ramtekkar.D.M	Chief Engineer (R2)	dramtekkar@bmrcl.co.in
18			✓	Mr. Renuka Prasad	AEE (D &UG)	-
19			✓	Mr. Ravi Prakash	Manager (Public Relations)	mpr@bmrcl.co.in
20			✓	Mr. Daljeet Singh	Chief Project Manager	daljeet2hotmail.com
21			✓	Mr. Jitender Tyagi	Chief General Manager / Chief Tender	cpm_metro@rediffmail.com
22			✓	Mr.P.Thirugnanam	CMRL	acec.cmrl@tn.gov.in
23			✓	Mr. C Kannan	GC of CMRL	cn_kannan@yahoo.co.in
24			✓	Mr. D.C Mitra	CMRCL, Chief Engineer, dcmitra@gmail.com)	dcmitra@gmail.com
25			✓	Dr. B C Roy	GC of KMRCL, Joint Project Director	bidhan.roy@cesinter.com
26		✓	Mr. Ramana	Additional Chief (Transport & Planning)	ramana.r224@gmail.com	
27		✓	Mr. Vikas Tonwalkar	Mumbai Metro	tonwalkarvikas@yahoo.co.in	
28		✓	Ms.N.Sumi		sumin@kochimetro.org	
29		✓	Mr. Chandra Babu	Superintendent Engineer	chandrababu@kochimetro.org	
30		✓	Mr. Mohamed Basheer		bas mohamed@gmail.com	
31		✓	Mr. Sheikh Omar Faruque	Traffic Enforcement Officer	sofar92@hotmail.com	
32		✓	Mr. M. Emdad-ul Haque	Senior Assistant Chief, Roads Division	emdadshipar@gmail.com	
33		✓	Mr. Sirichai Teedee	MRTA (Mass Rapid Transit Authority of Thailand)	sirichai.mrta@gmail.com	
34		✓	Mr. Takayuki Isaka	Bangkok Metro GC, Railway Engineer	isakat@oriconsul.com	
35		✓	Mr. Rachmadi	Director of Engineering and Project	rachmadi@jakartamrt.com	
36		✓	Mr. Made Karmayoga	Provincial Planning	m.karmayoga@gmail.com	
37		✓	Mr. Nigel	Project Manager	nbutterfield@gc2bmrcl.co.in	
38		✓	Mr. Tezuka	Chief Engineer	yukiotezuka@yahoo.co.jp	
39		✓	Mr. Bala Krishna	Deputy Project Director	dypd.gc@gmail.com	
40		✓	Mr. Murty	Chief Regional Engineer	murtykvvr@rediffmail.com	
41		✓	Mr. Brian Blower	Chief Contract Manager	brianblower@gc2bmrcl.co.in	
42		✓	Mr. Stephen Pollak	Chief Safety Engineer	stephen@gc2bmrcl.co.in	
43		✓	Mr. Druva Sen	Program Expert	sen.druva@gmail.com	
44		✓	Mr Jayaraman	QAC Engineer	rjayaraman@gmail.com	
45		✓	Mr. Suhaskamat	Co-ordinating Manager	suhaskamat59@yahoo.com	
46		✓	Mr. B.S Srinivas	Chief Resident Engineer	srinubs@gmail.com	
47		✓	Dr. Narendra B.S	Structural Expert	narendrabs@gc2bmrcl.co.in	
48		✓	Mrs. Gowri	Support Engineer	gowrianand@gmail.com	
49		✓	Mr. Vijay Kumar	Safety Engineer	vijaykumar.rites@gmail.com	
50		✓	Mr. M.G. Mohan	Safety Engineer	mg_mohan2003@yahoo.co.in	
51	✓	Mr. Gopal	QA/QC Engineer, UG2	gopal63@gmail.com		
52	✓	Mr. Ramesh	QC Enginner, R2	budalbhilai@yahoo.co.in		
53	✓	Mr. Mohammad Saddique	QC Engineer	sadiq-rites@live.com		
54	✓	Mr. Simon	QC Enginner, R3	sm_metro2yahoo.co.in		
55	Contractor	CEC-Soma-JV	✓	Mr. Ken Wang	Project Leader	kenwong@cecsoma.cicijv.com
56			✓	Mr. M.M Raju	Deputy Project leader	mmraju@soma.co.in
57			✓	Mr. K Raju Rao	Instrumentation Engineer	rajukurpila@cecsomacicijv.com
58			✓	Mr. Kanchan Kumar	Geotechnical Manager	kanchan@cecsomacicijv.com
59			✓	Mr. Y Balachinnappa	General Manager (Station)	ybalachinnappa@soma.co.in
60			✓	Mr. Y Satish	Deputy General Manager-Civil	yssatish@soma.co.in
61			✓	Mr. Devanand Rao	Deputy General Manager - Civil	mdrao@yahoo.com
62			✓	Mr. Sawan Kotwal	-	sawan@cec-soma-cicijv
63			✓	Mr. H.S. Mahesh	-	Madhu.sshankar@gmail.com
64			✓	Mr. Nazar	DGM	nazarta@soma.co.in
65			✓	Mr. Rajesh Nair	Design Manager (Soma)	rajeshnair@soma.co.in
66			✓	Mr. Dilip	Instrumentation Engineer	dilip@cecsomacicijv.com
67			✓	Mr. Avinash	Safety Engineer	avinash-shet@hotmail.com
68	✓	Mr. Shailesh	Safety Manager	shaileshclare@soma.co.in		
69	University / Institute / Lab	SMCC Construction India Limited	✓	Mr. Kenichi Saito	Civil department manager for SMCC India	ksaito@smcon.co.jp
70			✓	Prof. T.G. Sitharam	Chairman	sitharam@civil.iisc.ernet.in
71		I.I.Sc. Bangalore	✓	Mr. Ramjee	Research Scholar	ramjee@civil.iisc.ernet.in
72			✓	Mr. S.M Patil	Monitoring Analyzer	sammedpatil@gmail.com
73		Tokyo University	✓	Mr Mahesh	Research Scholar	mahesh@cistup.iisc.ernet.in
74			✓	Mr. Yoshino	Director	yoshinohiroshi69@gmail.com
75		CRRI	✓	Dr. Ch.Ravi Sekhar	Senior Scientist, RDM Division	chalumuri.ravisekhar@gmail.com
76			✓	Dr.B.Kanagadurai	HOD, RDM Division, CSIR-CRRI,	durai.cri@nic.in
77		✓	Mr Kishore Kumar	Sr. Principal Scientist	kishornhrm@gmail.com	
78		National Institute of Rock Mechanics	✓	Mr. Surendra Roy	Scientist-III, Environmental Engineering	surendraro@yahoo.com
79	✓		Mr. Piyush Gupta	National Institute of Rock Mechanics	piyush12312@gmail.com	
80	M S Ramaiah Institute of Technology	✓	Dr. K.P Nagaraj	Prof & HOD	kpnraj@gmail.com	
81		✓	Mr. Manish Mehta	Regional Manager	dhn3will@gmail.com	
82	Others	Encardio-rite Electronics Pvt Ltd	✓	Mr. Kumar Vishesh	Area Manager	erbr@encardio.com
83			✓	Mr.Hari P.K.	Instrumentation Engineer	hari_pankom@yahoo.co.in
84			✓	Mr. Akshay	Instrumentation Engineer	akshay.111@rediffmail.com
85		JETRO	✓	Mr. Kazumasa Kuboki	Senior Advisor, Bangalore.	jetrosan@airtelmail.in
86			✓	Mr. Hiromichi IDO	Senior Managing Director	ido@enzan-k.com
87		Council Aid	✓	Mr. L.N Prasad	Director-Planning	ln.prasad@in.bureauveritas.com
88			✓	Mr. M.T Sudhakar Rao	Executive Director (HR)	edhr@hal-india.com
89		Hindustan Aeronautics Ltd (HAL)	✓	Mr. Udaykumar	General Manager (FMD)	agnfm@hal-india.com
90			✓	Mr. Sam Bassail Job	Deputy General Manager	bassail@yahoo.com
91		Oriental Consultants Co. Ltd.	✓	Miss R. ABE	Project Manager	aber@oriconsul.co.jp
92	✓		Mr. Y. Yamamura	Monitoring Manager	yamamury@oriconsul.com	
93	✓		Mr. S. Kamal	Coordinator	kamals@oriconsul.com	







94	JICA Team		✓ Mr. R. Naveen	Monitoring Engineer	naveen.ravuri456@gmail.com
95			✓ Mrs. R. Sowmya	Secretary	sowmyarites@gmail.com
96		Kobe University	✓ Prof. S. Akutagawa	Professor	cadax@kobe-u.ac.jp
97			✓ Mr. Nishio	Doctor Student	
98			✓ Mr. Y. Minami	Master Student	james.liamerson@gmail.com
99		Yamaguchi University	✓ Prof. M. Shinji	Professor	shinji@yamaguchi-u.ac.jp
100			✓ Mr. Y. Sasaki	Master Student	r013vf@yamaguchi-u.ac.jp
101		The General Environmental Technos	✓ Mr. A. Takahashi	Instrumentation Engineer	takahashi_atsushi@kanso.co.jp
102		Encardio-rite Electronics Pvt Ltd	✓ Mr. L. Nagaraj	Monitoring Engineer	nagaraj.12007@rediffmail.com




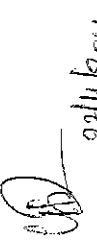
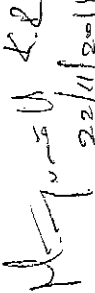
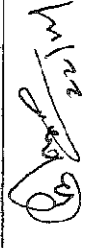

**Confirmed Participants List of Seminar on "On Site Visualization and Dust Monitoring at Bangalore Metro Construction Sites"**

On 22 <sup>nd</sup> November 2011 at the Faculty Hall, IISc, Bangalore							
Sl. No.	Name	Affiliation	Organisation	Contact Details	Email ID	Registration Yes/No	Signature
1	Prof. M.R. Pranesh	Advisor & Prof. Emeritos	East West Institute of Technology	9845960865	<a href="mailto:mrpewit@gmail.com">mrpewit@gmail.com</a>	Y	
2	Shri. Raghuv eer.N	Lecturer	East West Institute of Technology	9886966118	<a href="mailto:veerragh3@gmail.com">veerragh3@gmail.com</a>	Y	
3	Shri. Jagadeesh		KERF				
4	Shri. Milan Kulkarni	Student	RASTA-Center for Road Technology	9972515234	<a href="mailto:Milan.kulkarni@gmail.com">Milan.kulkarni@gmail.com</a>	Y	
5	Shri. Vineethraj B Math	Student	RASTA-Center for Road Technology	9740218227	<a href="mailto:vinit555@gmail.com">vinit555@gmail.com</a>	Y	
6	Ms. Suvarna. P	Student	RASTA-Center for Road Technology	9035885409	<a href="mailto:suvarna7583@yahoo.com">suvarna7583@yahoo.com</a>	Y	
7	Ms. Monica. M.S	Student	RASTA-Center for Road Technology	9945784415	<a href="mailto:monica_ms2003@yahoo.com">monica_ms2003@yahoo.com</a>	Y	
8	Dr. Harish. M	Transport Planner	CISTUP		<a href="mailto:harish@cistup.iisc.ernet.in">harish@cistup.iisc.ernet.in</a>	Y	
9	Dr. Gururaja. K.V	Urban Planner/GIS Analyst	CISTUP	080-22932043-31	<a href="mailto:gururaj@cistup.iisc.ernet.in">gururaj@cistup.iisc.ernet.in</a>	Y	


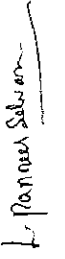


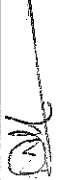



10	Shri. Devaraj.H	Research Scholar	CiSTUP, IISc	9035258621	<a href="mailto:devaraj@cistup.iisc.ernet.in">devaraj@cistup.iisc.ernet.in</a>	Y	
11	Ms. Raji. M	Research Scholar	CiE, IISc		<a href="mailto:rajim@civil.iisc.ernet.in">rajim@civil.iisc.ernet.in</a>	Email	
12	Shri. Abhishek Kumar		CiE, IISc		<a href="mailto:abhishek@civil.iisc.ernet.in">abhishek@civil.iisc.ernet.in</a>	Email	
13	Shri. Sandeep Kumar Chouksey		CiE, IISc	79808 40380	<a href="mailto:sandeepkc@civil.iisc.ernet.in">sandeepkc@civil.iisc.ernet.in</a>	Email	
14	Shri. Niranjan.G. Hiremath	Lecturer	Dayanand Sagar College of Engineering	08880184628/9 535618742	<a href="mailto:niranjan.hiremath@rediffmail.com">niranjan.hiremath@rediffmail.com</a>	Y	
15	Shri. Deepdarshan. K.P	Student	Dayanand Sagar College of Engineering	9164348821	<a href="mailto:deepdarshan.kp@gmail.com">deepdarshan.kp@gmail.com</a>	Y	
16	Shri. Shiva Prasad.K	Student	Dayanand Sagar College of Engineering	9620173666	<a href="mailto:shivu.prasad@gmail.com">shivu.prasad@gmail.com</a>	Y	
17	Ms.Sindhu Narasimataiah	Student	Dayanand Sagar College of Engineering	9916162105	<a href="mailto:sheena.sindhu@gmail.com">sheena.sindhu@gmail.com</a>	Y	
18	Ms. Akshatha.M	Student	RASTA-Center for Road Technology	9902442784	<a href="mailto:akshathasheregar@gmail.com">akshathasheregar@gmail.com</a>	Y	
19	Shri. Bhanuprakash Kulkarni	Student	RASTA-Center for Road Technology	9611669387	<a href="mailto:kulkarnibhanuprakash@gmail.com">kulkarnibhanuprakash@gmail.com</a>	Y	









20	Dr. L. Govindaraju	Associate Professor	Ci.E, Bangalore University	080-22961558/9480262312	lgr_civil@yahoo.com	Y	
21	Dr. V. Devaraj	Professor	Ci.E, Bangalore University	080-22961558/9480262312		Y	
22	Shri. Bharath Babu.M.D	Student	Bangalore University, Jnanabharathi	9916579179	babubud013@gmail.com babucivil013@gmail.com	Y	
23	Shri. Kamalakara.G.K	Student	Bangalore University, Jnanabharathi	9964464188	kamath.cvikamk018@gmail.com	Y	
24	Shri. Kashivishwanatha Darshan	Student	Bangalore University, Jnanabharathi	9743432480	darshan2910@gmail.com	Y	
25	Shri. Mahantesh Chougale	Student	Bangalore University, Jnanabharathi	9489562122	Mahanteshc@gmail.com	Y	
26	Shri. Sharanabasappa Kori	Student	Bangalore University, Jnanabharathi	9731795670	sharanukori67@gmail.com	Y	
27	Shri. Shivaraj. N	Student	Bangalore University, Jnanabharathi	8861211891	shivaraj.n10@gmail.com	Y	
28	Ms. Muktha Kabbur	Student	Bangalore University, Jnanabharathi	8147357282	muktha.kabbur@gmail.com	Y	M.S.Kabbur
29	Shri. Chudanand G. Naik	Student	Bangalore University, Jnanabharathi	9481052256	Naik.aed@gmail.com	Y	
30	Ms. Shubha. B.S	Student	Bangalore University, Jnanabharathi			Y	

31	Ms. Shilpa Shet. S	Student	Bangalore University, Jnanabharathi	9986981802	chimmushet@gmail.com	Y	
32	Ms. Usha.P	Student	Bangalore University, Jnanabharathi	9916825276	usharmp02@gmail.com	Y	
33	Shri. Chandrashekar. A.S	Student	Bangalore University, Jnanabharathi			Y	
34	Shri. Darshan.K.R	Student	Bangalore University, Jnanabharathi	9966335564	darshangandhi@gmail.com	Y	
35	Shri. Shivaraj	Student	Dayanand Sagar College of Engineering		raj25.shirur@gmail.com	Y	
36	Shri. Kiran	Student	Dayanand Sagar College of Engineering			Y	
37	Shri. Harish.H.S	Student	JIT			Y	
38	Shri. Avinash.N.P	Student				Y	
39	Shri. Prasad.B.R	Student				Y	
40	Shir. Deni Singh	Student				Y	
41	Ms. Anitha Kumari.S.D	Research Scholar	Ci.E, IISc		anitha@civil.iisc.ernet.in	Email	

42	Shri. Vipin.K.S	Post Doctoral Fellow	Ci.E, IISc	080-42161093						
43	Dr. Prakash. P	Professor & HOD	CTM Dept, Dayanand Sagar College of Engineering	080-42161093	<a href="mailto:prakash.dsce@gmail.com">prakash.dsce@gmail.com</a>	Y				 22/11/2011
44	Shri. Manish.S	Lecturer	CTM Dept, Dayanand Sagar College of Engineering	080-42161093	<a href="mailto:manish.shashikant@gmail.com">manish.shashikant@gmail.com</a>	Y				
45	Shri. Deepak V Golasangimath	Lecturer	CTM Dept, Dayanand Sagar College of Engineering	080-42161093	<a href="mailto:Deepak.gv@gmail.com">Deepak.gv@gmail.com</a> <i>deepak.gv@gmail.com</i>	Y				 22/11/2011
46	Shri. Manjunath.K.R	Lecturer	Dayanand Sagar College of Engineering	9902833363	<a href="mailto:cemanju84@gmail.com">cemanju84@gmail.com</a>	Y				 22/11/2011
47	Shri. Sreevals Kolathayar	Student	Ci.E, IISc	9482088377	<a href="mailto:sreeiisc@yahoo.com">sreeiisc@yahoo.com</a>	Y				 22/11/2011
48	Ms. Supriya Dey	Student	Organic Chemistry, IISc	080- 22932406/9740 006768	<a href="mailto:supriyadev2000@gmail.com">supriyadev2000@gmail.com</a>	Y				
49	Shri. Ashish Kumar Pradhan	Student	Nanoengineering for Integrated Systems(NIS), IISc	9483824450	<a href="mailto:ashish@cadi.iisc.ernet.in">ashish@cadi.iisc.ernet.in</a>	Y				 22.11.11
50	Shri. Rimjhim Agrawal	Student	EE, IISc	9342966995	<a href="mailto:rimjhim@ee.iisc.ernet.in">rimjhim@ee.iisc.ernet.in</a>	Y				
51	Shri. Adinarayana pularparthi	Student	Computer Science and Automation, IISc	9632187179	<a href="mailto:adinarayana@cse.iisc.ernet.in">adinarayana@cse.iisc.ernet.in</a>	Y				



52	Shri.Raja J	Student	Ci.E, IISc	8762997247	iiscraja@yahoo.in	Y	
53	Shri. L.Panneerselvam	Student	Ci.E, IISc	9611190695	panneer7selvam@gmail.com	Y	
54	Shri.Sandeep Kumar Chouksey	Student	Ci.E, IISc	9980840386	sandeepkc@civil.iisc.ernet.in	Y	
55	Shri. Anil Kumar Sharma	Student	Ci.E, IISc	9535145760	anilkr@civil.iisc.ernet.in	Y	
56	Shri.Madhusudhan N	Student	Ci.E, IISc	9964059480	sudhan.rvce@gmail.com	Y	
57	Shri. S M Patil	Student	Ci.E, IISc	9731035639	sammedpatil@civil.iisc.ernet.in	Y	
58	Shri.Sarjay kumar	Student	Mechanical, IISc	9379720475	skgupta@mecheng.iisc.ernet.in	Y	
59	Shri. Mani Kant Verma	Student	Ci.E, IISc	9483709765	mani.kant300988@gmail.com	Y	
60	Shri. Koti Reddy Allu	Student	CISTUP, IISc	9611188949	kotireddy.allu@cistup.iisc.ernet.co in	Y	
61	Shri.Anil Kumar Sharma	Student	Ci.E, IISc	9535145760	anilkr@civil.iisc.ernet.in	Y	 22/11/11
62	Shri.Ankur Miglani	Student	Mechanical, IISc	9483716322	ankur.miglani@mecheng.iisc.ernet.i n	Y	
63	Shri.D.Harinadha Reddy	Student	Ci.E, IISc	8123069120	harinadh@civil.iisc.ernet.in	Y	
64	Ms. Aswathy V Nair	Student	CAOS, IISc	9535145725	aswathy@caos.iisc.ernet.in	Y	

65	Prof. Rajasakara Murthy	Scientist Emeritus, Visiting Prof.	CISTUP, IISC	9056325080	dakshamurthy@hotmail.com	Y	
66	Sri. A.N. Shivakumar	Asst. Executive Engineer	KSRTC, Hassan	080-22221321	www.ksrtc.in	Y	
67.	Shri. Abhishek Tiwari	Student	Jain University		abhishek.tiwari585@gmail.com	Y	
68.	Ms. Divya. B.K	student	Jain University.		divyabk13@gmail.com	Y	
69.	Ms. Sneha Swadi	"	"		snehaswadi@gmail.com	Y	
70	Ms. Soumya Haranahalli	"	"		soumya.ah.india@gmail.com	Y	
71.	Ms. Meenakshi	CISTUP Staff	CISTUP IISC.		meenakshi@cistup.iisc.ac.in	Y	
72	Mr. Jeevan George	Analyst	Feedback		jeevan@feedbackconsulting.com	Y	
73	Madhura. KS	BMRCL			madhura.ks@gmail.com	Y	
74	Rashmi. S.R	CEC SOMA CICI BY			rashmi.s.r.4@gmail.com	Y	

75	Dr. N. Nagappan		KSPCB			agme@kspcb. gov.in 908277338			
76	Dr. Shivamanda	Speaker	Dr. Chief Engineer BMRCL	9480825736		shivamanda@bmrcl.co.in			
77	Magulathu		EA (PI) BMRCL	9448287974		magulathu@bmrcl.co.in			
78	Dr. GLS. Shivakumar Babu		IIS, Civil Engg						
79	Dr. Ravi Shankar		SENIOR CHIEF RDH DIVISION CRRI New Delhi	98650182		chalamuri.ravi.shankar@gmail.com			
80	Vengalala.SR		U.V.C.E. BUG.	9141773258		vengalalasr@gmail.com			
81	Gowri		GIC (BMRCL)	9469874442		gowriarand@gmail.com			
82	SARAVANAN		IIS (AE)	9880583751		Saravanan@aeu. IISc.acadmission			
83	S.K. KUMAR		RAJ	949589856					

84	Supreetha V	Ge. Brnce	9739180972	Supreetha.66@gmail.com	Y	Supreetha
85	Gopi Karthikeyan	Boy	RITUS 945874558	g.bmr2007@gmail.com	Y	<del>Supreetha</del>
86	Sanjay m. Sidi	Student	MSC 554505809	sanjaym@gnps.ac.in	Y	Sanjay
87	Sanjosh	sm	CISTUP		Y	Sanjosh
88	Havi Kishore	Student	CISTUP	havi.kishore@cistup.iisc.ernet.in	Y	H. Kishore
89 89	Ranjee	Student	Civil	ranjee@gnps.ac.in	Y	Ranjee
90	Satish	Student	CISTUP	bansathisha@cistup.iisc.ac.in	Y	<del>Sanjay</del>
91	Siddeshwar	Student	CISTUP	Siddeshwar@gnps.ac.in	Y	Siddeshwar
92	S. V. Dinesh	Prof.	SIT Tumkur	dineshsvr@gmail.com	Y	S. V. Dinesh







## Safety First!

This is the concept and the slogan shared by all, required for all, but difficult to achieve throughout the world. Construction sites are full of dangers. Workers are exposed to various kinds of "Unexpected Accidents" that threaten their lives, delay construction and make owners to pay more.

# Stay safe.



Light Emitting Diodes (LED) are showing forces in struct beams.

## OSV helps your safety management.

New type of sensors is developed for simultaneous monitoring and visualization of safety and risk conditions at construction sites. These sensors are designed and built based on the new monitoring concept called "On Site Visualization" and capable of 1) sending data and 2) visually outputting the measurement results simultaneously by using LED for workers and all concerned. Blue lights in the picture on the left are from those light emitting sensors, showing the current status of strut beams forces, wall inclination, etc. This type of data can be shared both by workers and public. Blue color indicates that the sensor reading is small and there is no problem in terms of safety. When the color changes from blue to cyan/green, yellow and red, everyone can visually identify the safety condition is changing accordingly. Necessary actions including evacuation can be incorporated in the safety manual.

## Dust monitoring by mobile phone watches your working environment.

Improvement of working environment is a must at any construction site around the world to protect workers from labor induced diseases. Quick and handy dust monitoring method was developed at Shiga laboratory, Yamaguchi University, Japan. In this method, a mobile phone camera is used, instead of a digital camera, which is used to take a flashed picture and calculate dust concentration immediately by itself. The new method is more economical, easy to perform, and also has a high correlation with digital dust indicator.

Mobile phone is used to take a picture of dust with flash. The quick and handy method gives immediate dust concentration at construction sites.

# Breathe clean.

Project Manager  
Miss R. Abe, Oriental Consultants  
Deputy Project Manager  
Mr. A. Nishikiori, Oriental Consultants  
Adviser for OSV Monitoring  
Prof. S. Akutagawa, Kobe University  
Adviser for Dust Monitoring  
Prof. M. Shinoji, Yamaguchi University

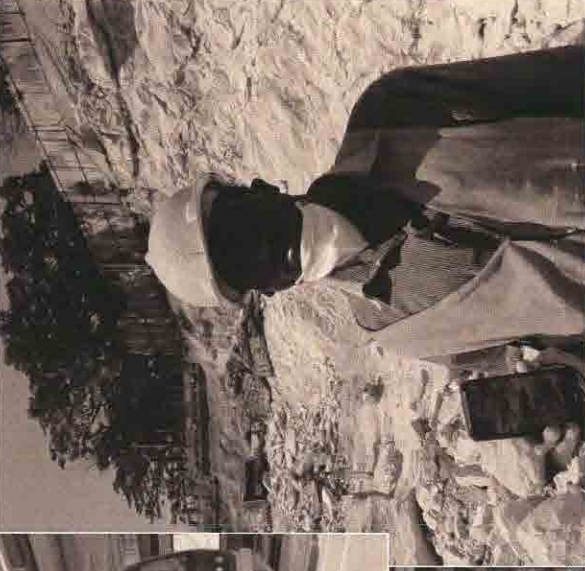
Adviser for OSV Safety Training  
Mr. C. Izumi, Oriental Consultants  
Monitoring Manager 1  
Mr. H. Imamura, Oriental Consultants  
Monitoring Manager 2  
Mr. S. Nagano / Mr. Y. Yamamura, Oriental Consultants  
Specialist for Instrumentation  
Mr. A. Takahashi, The General Environmental Technos  
Support staff  
Mr. S. Kamae, Oriental Consultants, Delhi  
Assistant for Monitoring  
Mr. Y. Sasaki, Oriental Consultants (Yamaguchi University)  
Assistant for Monitoring  
Mr. Y. Minami, Oriental Consultants (Kobe University)

Cooperate with  
Indian Institute of Science  
Central Road Research Institute

Supported by  
Bangalore Metro Rail Corporation Limited  
RITES-OC-PBI-SYSTRAL JV  
CEC-SOMA-CICI JV

Special Assistance for Project Implementation (SAPI)  
applying

# On Site Visualization and Dust Monitoring at Bangalore Metro construction sites



SAPI for Bangalore Metro Project utilizing Japanese ODA  
Japan International Cooperation Agency  
June 2011. to January 2012





OSV monitoring is implemented near HAL building with the array of strain and inclination sensors and Light Emitting Converters (LEC) mounted on its wall and strut beams to visualize movements induced by excavation works. The site lit by OSV sensors will be exposed to workers and public eyes where critical information on safety is disclosed by color of light to achieve advanced safety management.

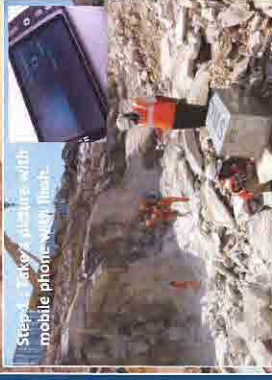


Light Emitting Converters (LEC) can be used together with arbitrary sensor to process measured data and show their magnitude by color of LED.

## On Site Visualization for BMRC

Employment of the OSV monitoring method, developed by Professor S. Akutagawa of Kobe University, Japan, and OSV Consortium companies, enables real-time data processing and visualization on-site, so that the state of deformation, strain, inclination, earth pressure etc. for the structures in concern can be grasped with no delay in time and is shown visually to anyone nearby. It has been applied at more than 30 locations in Japan since 2006. With the support by Japan International Cooperation Agency and Delhi Metro Rail Corporation, the OSV monitoring was also conducted at two sites in New Delhi in 2010. The OSV monitoring near HAL building has been in place since July 2011.

Rationally designed use of this method could give us early warning signs, if any, and minimize risks not only during construction of underground infrastructures but also during their service time. On Site Visualization, once embodied in the framework of safety management practices, could lead to a better and quick understanding of potential risks and improved management of safety at construction sites.



Step 1 : Worker with mobile phone - Wggy (Wggy)



Step 2 : Dust density computed by the mobile phone is displayed on the board.



Step 3 : Wear appropriate masks.



0~3 mg/m<sup>3</sup>



3~6 mg/m<sup>3</sup>



6~ mg/m<sup>3</sup>

## Dust Monitoring by mobile phone for BMRC

In India, there is a regulation that dust concentration during construction must be less than 2.5 mg/m<sup>3</sup>. However, dust monitoring or countermeasures have not been properly implemented so far. The purpose of this dust survey, therefore, is to carry out the new dust monitoring method developed by Professor M. Shinji of Yamaguchi University, Japan, to plan and execute the environmental management system using the dust concentration data measured, to inform field workers of the risk of dust and as a result and to refine environment management practices of BMRC.

Dust monitoring by mobile phone cameras has two features. One is the improvement of worker's awareness about health threat caused by industrial dust, and the other is that workers can implement the countermeasures to control the dust immediately after measurement. When this dust survey is implemented, workers can measure the dust concentration regularly by using mobile phone camera, show the result to those concerned and implement necessary countermeasures. In addition, by presenting a colored panel in accordance with the results, all workers can identify the state of dust concentration in the field and wear no or appropriate masks.



## **ANNEX 4**

Safety Manual using OSV Monitoring

and

Environmental Manual using DUST Monitoring

(DVD attached)