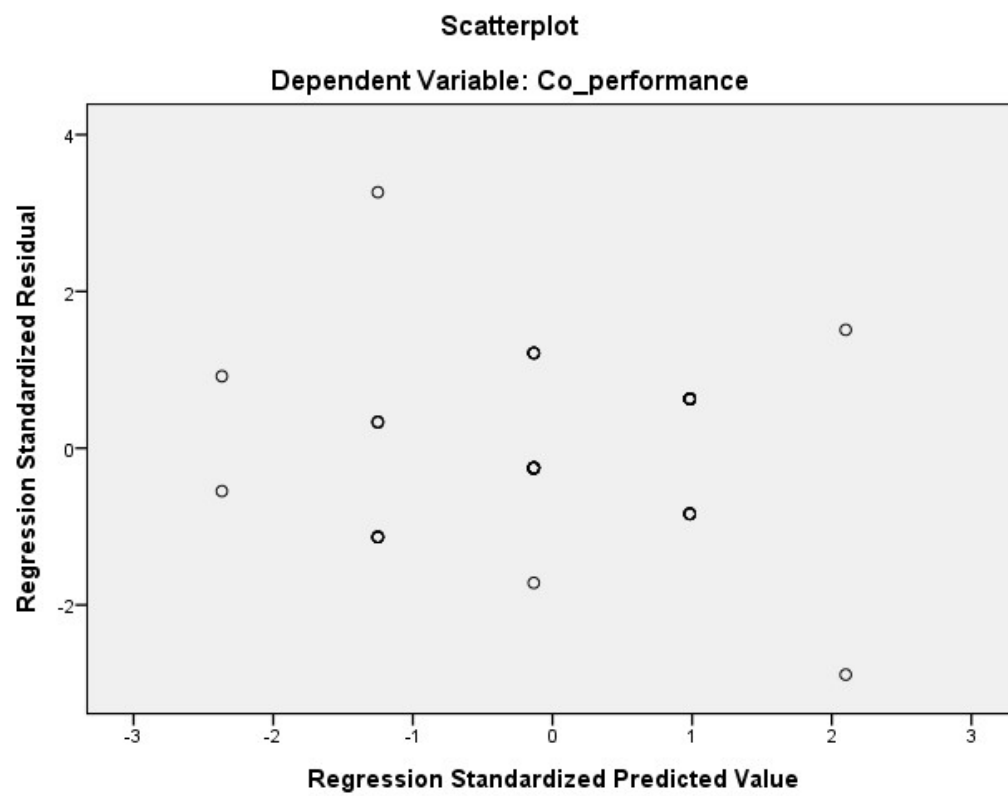
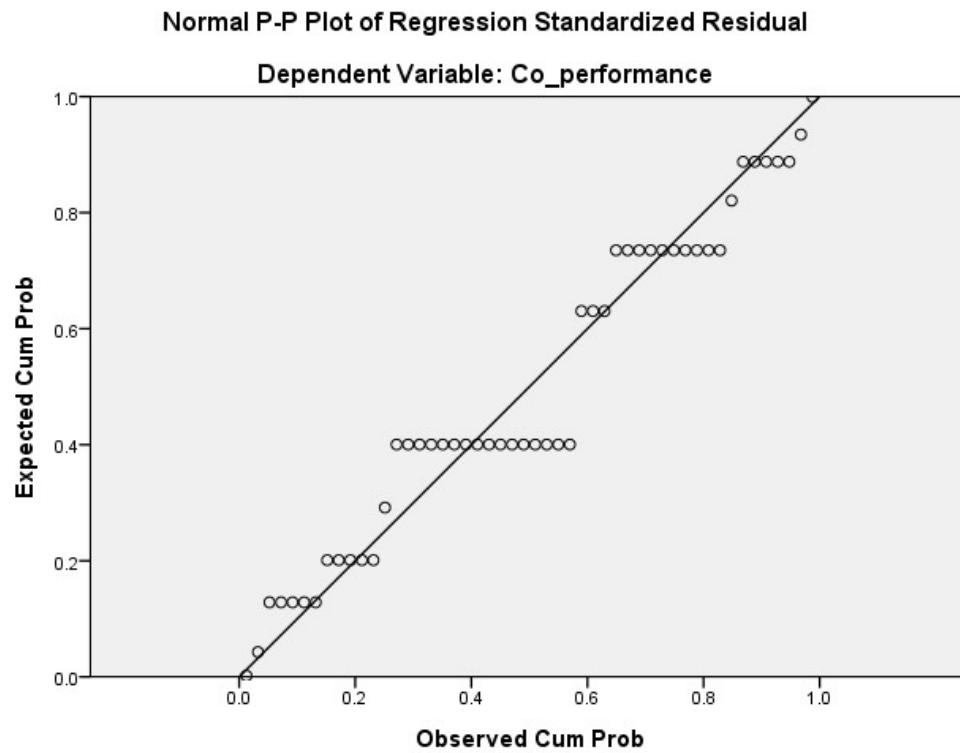


Charts



```

REGRESSION
/DESCRIPTIVES MEAN STDDEV CORR SIG N
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT Co_support
/METHOD=ENTER OrgC AccidE InspE ProcessC TrainE TrainC EC_Ssat
/SCATTERPLOT=(*ZRESID ,*ZPRED)
/RESIDUALS NORMPROB(ZRESID)
/CASEWISE PLOT(ZRESID) OUTLIERS(3).

```

Regression 2

(Analysis the relation between the Company Safety Support and other Variables)

Other variables:

1. OrgC
2. AccidE
3. ProcessC
4. TrainE
5. TrainC
6. EC_Ssat

Notes

Output Created	19年12月2015日 下午03時57分32秒	
Comments		
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	Weight	<none>
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	File	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax	REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT Co_support /METHOD=ENTER OrgC AccidE InspE ProcessC TrainE TrainC EC_Ssat /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).	
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	Additional Memory Required for Residual Plots	520 bytes

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Descriptive Statistics

	Mean	Std. Deviation	N
Co_support	3.12	.895	50
OrgC	3.3700	.76805	50
AccidE	3.9600	.60474	50
InspE	3.7700	.75734	50
ProcessC	3.2200	.81541	50
TrainE	3.2700	.77070	50
TrainC	3.3300	.84280	50
EC_Ssat	3.20	.808	50

Correlations

		Co_support	OrgC	AccidE	InspE	ProcessC	TrainE	TrainC	EC_Ssat
Pearson Correlation	Co_support	1.000	.646	.329	.011	.634	.499	.420	.643
	OrgC	.646	1.000	.461	.000	.397	.448	.273	.388
	AccidE	.329	.461	1.000	.347	.432	.494	.337	.267
	InspE	.011	.000	.347	1.000	.265	.493	.337	-.090
	ProcessC	.634	.397	.432	.265	1.000	.626	.649	.474
	TrainE	.499	.448	.494	.493	.626	1.000	.685	.419
	TrainC	.420	.273	.337	.337	.649	.685	1.000	.366
	EC_Ssat	.643	.388	.267	-.090	.474	.419	.366	1.000
Sig. (1-tailed)	Co_support	.	.000	.010	.469	.000	.000	.001	.000
	OrgC	.000	.	.000	.500	.002	.001	.028	.003
	AccidE	.010	.000	.	.007	.001	.000	.008	.030
	InspE	.469	.500	.007	.	.031	.000	.008	.267
	ProcessC	.000	.002	.001	.031	.	.000	.000	.000
	TrainE	.000	.001	.000	.000	.000	.	.000	.001
	TrainC	.001	.028	.008	.008	.000	.000	.	.005
	EC_Ssat	.000	.003	.030	.267	.000	.001	.005	.
N	Co_support	50	50	50	50	50	50	50	50
	OrgC	50	50	50	50	50	50	50	50
	AccidE	50	50	50	50	50	50	50	50
	InspE	50	50	50	50	50	50	50	50
	ProcessC	50	50	50	50	50	50	50	50
	TrainE	50	50	50	50	50	50	50	50
	TrainC	50	50	50	50	50	50	50	50
	EC_Ssat	50	50	50	50	50	50	50	50

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	EC_Ssat, InspE, OrgC, TrainC, AccidE, ProcessC, TrainE	.	Enter

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825 ^a	.681	.628	.546

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.757	7	3.822	12.820	.000 ^a
	Residual	12.523	42	.298		
	Total	39.280	49			

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		Coefficients		Coefficients			for B		Correlations			Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.275	.647		-.426	.672	-1.580	1.029					
	OrgC	.486	.129	.417	3.760	.001	.225	.746	.646	.502	.328	.618	1.617
	AccidE	-.155	.163	-.105	-.952	.347	-.484	.174	.329	-.145	-.083	.626	1.598
	InspE	-.026	.136	-.022	-.195	.847	-.300	.247	.011	-.030	-.017	.577	1.733
	Process C	.397	.142	.362	2.806	.008	.112	.683	.634	.397	.244	.456	2.192
	TrainE	.031	.178	.026	.172	.864	-.329	.391	.499	.027	.015	.322	3.105
	TrainC	-.028	.139	-.026	-.202	.841	-.309	.253	.420	-.031	-.018	.442	2.262
	EC Ssat	.371	.121	.335	3.058	.004	.126	.615	.643	.427	.266	.634	1.577

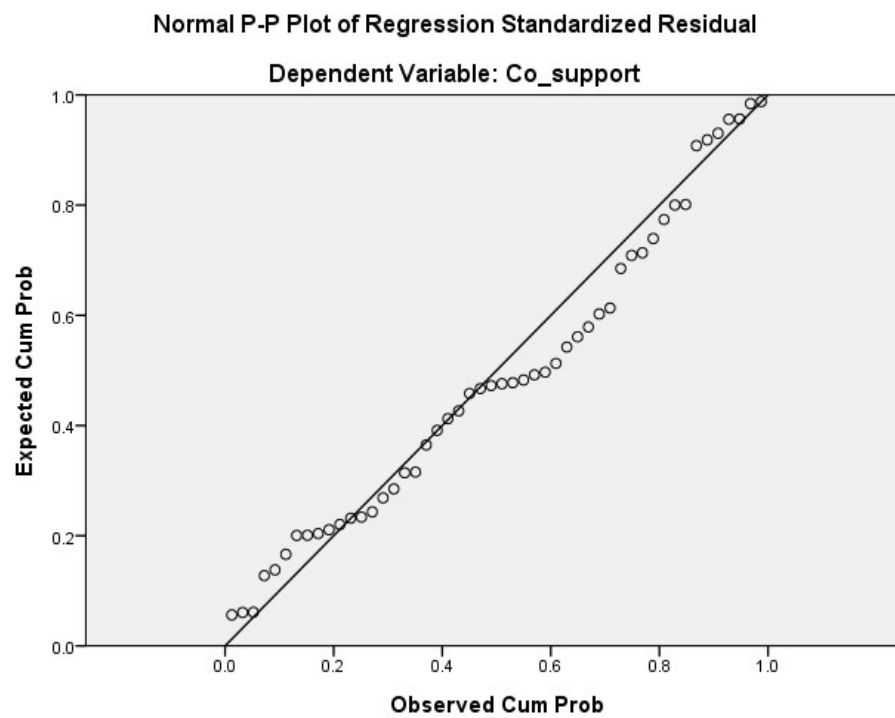
Collinearity Diagnostics^a

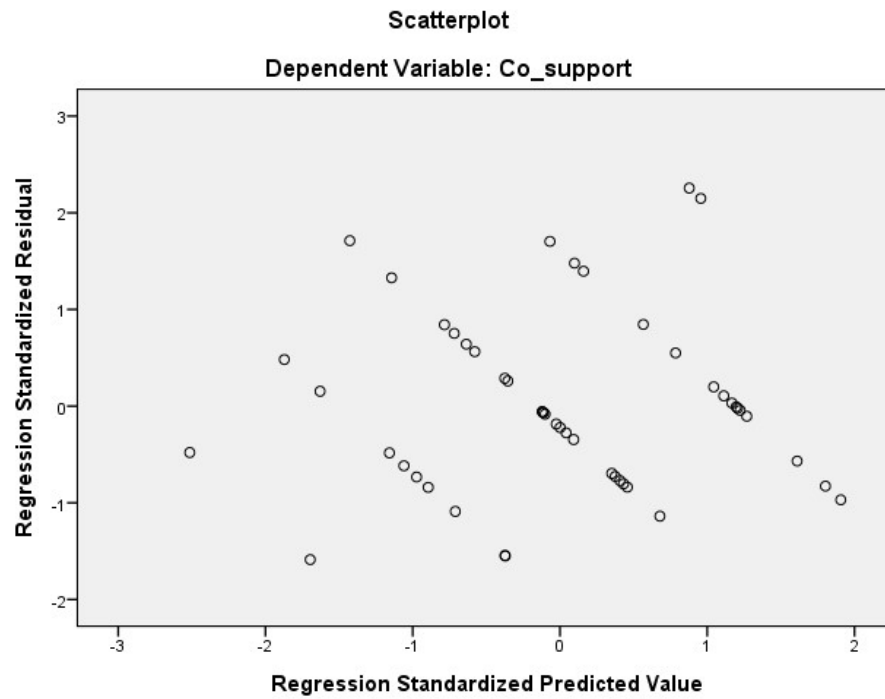
Model	Dimension	Eigenvalu e	Condition Index	Variance Proportions							
				(Constant)	OrgC	AccidE	InspE	ProcessC	TrainE	TrainC	EC Ssat
1	1	7.801	1.000	.00	.00	.00	.00	.00	.00	.00	.00
	2	.059	11.515	.01	.05	.00	.16	.01	.00	.00	.26
	3	.051	12.428	.04	.11	.03	.00	.09	.02	.17	.00
	4	.031	15.934	.03	.44	.00	.04	.02	.02	.00	.44
	5	.021	19.261	.02	.03	.02	.00	.74	.20	.07	.06
	6	.018	20.543	.12	.00	.00	.10	.09	.20	.62	.05
	7	.011	26.426	.03	.27	.82	.29	.02	.08	.00	.02
	8	.008	30.877	.75	.10	.12	.41	.02	.48	.13	.17

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.26	4.53	3.12	.739	50
Residual	-.867	1.232	.000	.506	50
Std. Predicted Value	-2.514	1.907	.000	1.000	50
Std. Residual	-1.587	2.255	.000	.926	50

Charts





```

REGRESSION
/DESCRIPTIVES MEAN STDDEV CORR SIG N
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT OrgC
/METHOD=ENTER AccidE InspE ProcessC TrainE TrainC
/SCATTERPLOT=(*ZRESID ,*ZPRED)
/RESIDUALS NORMPROB(ZRESID)
/CASEWISE PLOT(ZRESID) OUTLIERS(3) .

```

Regression 3

[Analysis the relation between Organization Structure (OrgC) and other Variables]

Other Variables:

1. AccidE
2. InspE
3. ProcessC
4. TrainE
5. TrainC

Notes

Output Created	19年12月2015日 下午03時59分44秒	
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	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax	REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT OrgC /METHOD=ENTER AccidE InspE ProcessC TrainE TrainC /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).	
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[DataSet1] C:\Users\user\Documents\lsms research_merge1_PCA_10element.sav

Descriptive Statistics

	Mean	Std. Deviation	N
OrgC	3.3700	.76805	50
AccidE	3.9600	.60474	50
InspE	3.7700	.75734	50
ProcessC	3.2200	.81541	50
TrainE	3.2700	.77070	50
TrainC	3.3300	.84280	50

Correlations

		OrgC	AccidE	InspE	ProcessC	TrainE	TrainC
Pearson Correlation	OrgC	1.000	.461	.000	.397	.448	.273
	AccidE	.461	1.000	.347	.432	.494	.337
	InspE	.000	.347	1.000	.265	.493	.337
	ProcessC	.397	.432	.265	1.000	.626	.649
	TrainE	.448	.494	.493	.626	1.000	.685
	TrainC	.273	.337	.337	.649	.685	1.000
Sig. (1-tailed)	OrgC	.	.000	.500	.002	.001	.028
	AccidE	.000	.	.007	.001	.000	.008
	InspE	.500	.007	.	.031	.000	.008
	ProcessC	.002	.001	.031	.	.000	.000
	TrainE	.001	.000	.000	.000	.	.000
	TrainC	.028	.008	.008	.000	.000	.
N	OrgC	50	50	50	50	50	50
	AccidE	50	50	50	50	50	50
	InspE	50	50	50	50	50	50
	ProcessC	50	50	50	50	50	50
	TrainE	50	50	50	50	50	50
	TrainC	50	50	50	50	50	50

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	TrainC, AccidE, InspE, ProcessC, TrainE	.	Enter

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.613 ^a	.376	.305	.64032

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.865	5	2.173	5.300	.001 ^a
	Residual	18.040	44	.410		
	Total	28.905	49			

Coefficients^a

Model		Coefficients											
		Unstandardized		Standardize	t	Sig.	95.0% Confidence Interval					Collinearity	
		Coefficients		Coefficients			for B		Correlations			Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-ord	Partial	Part	Toleranc	VIF
1	(Constant)	1.441	.675		2.134	.038	.080	2.802					
	AccidE	.429	.180	.338	2.390	.021	.067	.791	.461	.339	.285	.709	1.410
	InspE	-.335	.141	-.330	-2.375	.022	-.618	-.051	.000	-.337	-.283	.735	1.360
	ProcessC	.136	.160	.144	.850	.400	-.186	.459	.397	.127	.101	.491	2.035
	TrainE	.437	.193	.439	2.270	.028	.049	.825	.448	.324	.270	.380	2.631
	TrainC	-.113	.162	-.124	-.697	.489	-.440	.214	.273	-.105	-.083	.447	2.235

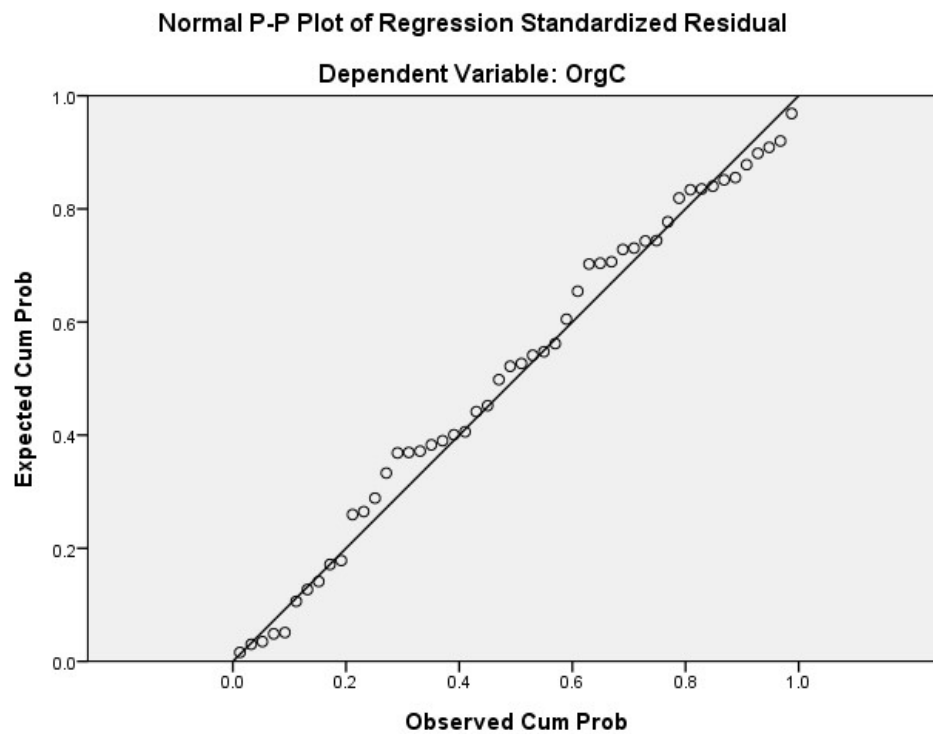
Collinearity Diagnostics^a

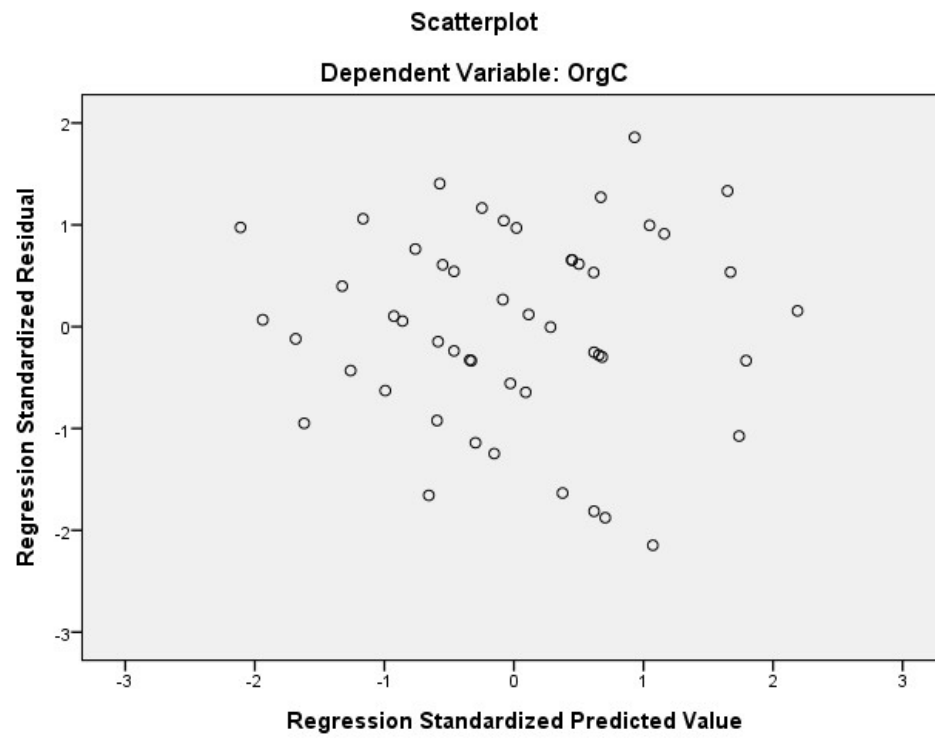
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	AccidE	InspE	ProcessC	TrainE	TrainC
1	1	5.879	1.000	.00	.00	.00	.00	.00	.00
	2	.049	10.910	.07	.03	.12	.14	.02	.13
	3	.027	14.890	.08	.08	.32	.25	.10	.07
	4	.019	17.605	.14	.00	.15	.38	.07	.61
	5	.016	19.127	.01	.16	.36	.23	.56	.06
	6	.010	24.802	.70	.72	.06	.01	.25	.13

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.3759	4.4006	3.3700	.47088	50
Residual	-1.37488	1.19134	.00000	.60677	50
Std. Predicted Value	-2.111	2.189	.000	1.000	50
Std. Residual	-2.147	1.861	.000	.948	50

Charts





```

REGRESSION
/DESCRIPTIVES MEAN STDDEV CORR SIG N
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT EC_Ssat
/METHOD=ENTER OrgC AccidE InspE ProcessC TrainE TrainC
/SCATTERPLOT=(*ZRESID ,*ZPRED)
/RESIDUALS NORMPROB(ZRESID)
/CASEWISE PLOT(ZRESID) OUTLIERS(3).

```

Regression 4

[Analysis the relation between Employee Safety Involvement (EC_Ssat) and other Variables]

Other variables:

1. OrgC
2. AccidE
3. InspE
4. ProcessC
5. TrainE
6. TrainC

Notes

Output Created	19年12月2015日 下午04時03分08秒	
Comments		
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax	REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT EC_Ssat /METHOD=ENTER OrgC AccidE InspE ProcessC TrainE TrainC /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).	
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	Additional Memory Required for Residual Plots	528 bytes

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Descriptive Statistics

	Mean	Std. Deviation	N
EC_Ssat	3.20	.808	50
OrgC	3.3700	.76805	50
AccidE	3.9600	.60474	50
InspE	3.7700	.75734	50
ProcessC	3.2200	.81541	50
TrainE	3.2700	.77070	50
TrainC	3.3300	.84280	50

Correlations

		EC_Ssat	OrgC	AccidE	InspE	ProcessC	TrainE	TrainC
Pearson Correlation	EC_Ssat	1.000	.388	.267	-.090	.474	.419	.366
	OrgC	.388	1.000	.461	.000	.397	.448	.273
	AccidE	.267	.461	1.000	.347	.432	.494	.337
	InspE	-.090	.000	.347	1.000	.265	.493	.337
	ProcessC	.474	.397	.432	.265	1.000	.626	.649
	TrainE	.419	.448	.494	.493	.626	1.000	.685
	TrainC	.366	.273	.337	.337	.649	.685	1.000
Sig. (1-tailed)	EC_Ssat	.	.003	.030	.267	.000	.001	.005
	OrgC	.003	.	.000	.500	.002	.001	.028
	AccidE	.030	.000	.	.007	.001	.000	.008
	InspE	.267	.500	.007	.	.031	.000	.008
	ProcessC	.000	.002	.001	.031	.	.000	.000
	TrainE	.001	.001	.000	.000	.000	.	.000
	TrainC	.005	.028	.008	.008	.000	.000	.
N	EC_Ssat	50	50	50	50	50	50	50
	OrgC	50	50	50	50	50	50	50
	AccidE	50	50	50	50	50	50	50
	InspE	50	50	50	50	50	50	50
	ProcessC	50	50	50	50	50	50	50
	TrainE	50	50	50	50	50	50	50
	TrainC	50	50	50	50	50	50	50

Variables Entered/Removed^b

	Variables Entered	Variables Removed	Method
Model			

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	TrainC, OrgC, InspE, AccidE, ProcessC, TrainE	.	Enter

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605 ^a	.366	.277	.687

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.706	6	1.951	4.134	.002 ^a
	Residual	20.294	43	.472		
	Total	32.000	49			

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	1.884	.761		2.475	.017	.349	3.418					
OrgC	.103	.162	.098	.635	.529	-.223	.429	.388	.096	.077	.624	1.602
AccidE	.069	.205	.052	.337	.738	-.344	.482	.267	.051	.041	.628	1.593
InspE	-.379	.161	-.355	-2.359	.023	-.702	-.055	-.090	-.338	-.286	.652	1.534
Process C	.277	.173	.279	1.600	.117	-.072	.626	.474	.237	.194	.483	2.069
TrainE	.340	.218	.324	1.558	.127	-.100	.780	.419	.231	.189	.340	2.939
TrainC	.036	.175	.038	.206	.838	-.317	.389	.366	.031	.025	.442	2.260

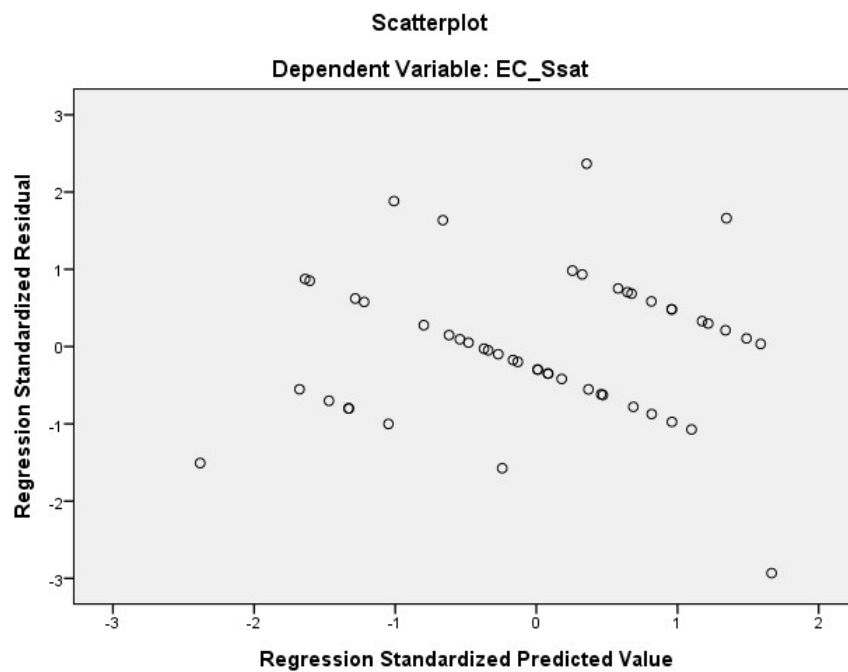
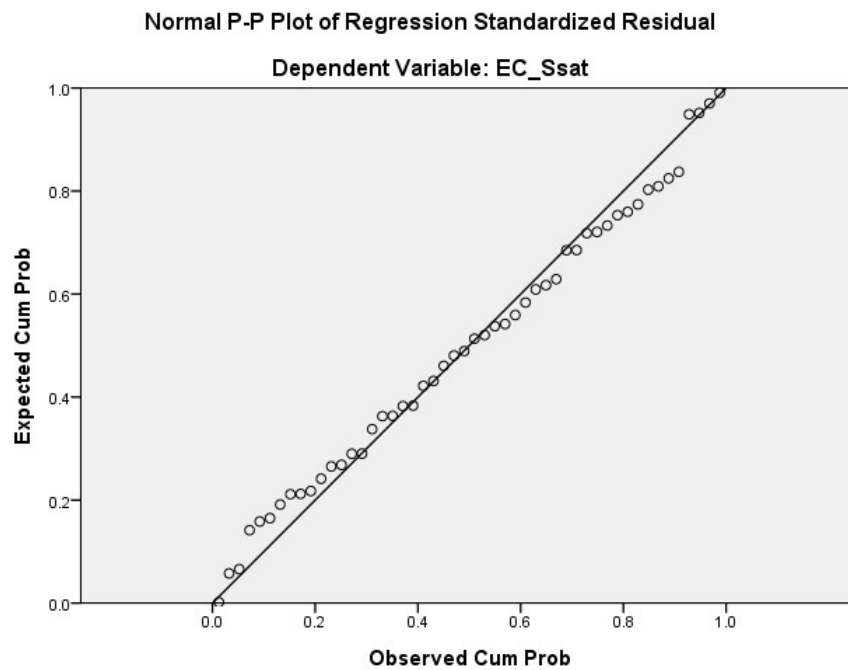
Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	OrgC	AccidE	InspE	ProcessC	TrainE	TrainC
1	1	6.843	1.000	.00	.00	.00	.00	.00	.00	.00
	2	.051	11.632	.05	.08	.03	.02	.11	.02	.16
	3	.045	12.366	.01	.31	.00	.26	.03	.00	.00
	4	.022	17.697	.08	.12	.02	.01	.52	.27	.02
	5	.019	19.003	.14	.00	.00	.11	.29	.10	.61
	6	.011	24.522	.00	.39	.64	.39	.04	.19	.02
	7	.009	27.133	.72	.09	.31	.20	.00	.41	.18

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.04	4.01	3.20	.489	50
Residual	-2.015	1.626	.000	.644	50
Std. Predicted Value	-2.382	1.667	.000	1.000	50
Std. Residual	-2.933	2.367	.000	.937	50

Charts



```

REGRESSION
/DESCRIPTIVES MEAN STDDEV CORR SIG N
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT ProcessC
/METHOD=ENTER AccidE InspE TrainE TrainC
/SCATTERPLOT=(*ZRESID ,*ZPRED)
/RESIDUALS NORMPROB(ZRESID)
/CASEWISE PLOT(ZRESID) OUTLIERS(3) .

```

Regression 5

[Analysis the relation between Organizational Process Control (ProcessC) and other Variables]

Other Variables:

1. AccidE
2. InspE
3. TrainE
4. TrainC

Notes

Output Created	19年12月2015日 下午04時04分48秒	
Comments		
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	N of Rows in Working Data	50
	File	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT ProcessC /METHOD=ENTER AccidE InspE TrainE TrainC /SCATTERPLOT=(*ZRESID ,*ZPRED) /RESIDUALS NORMPROB(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3).
Resources	Processor Time	00 00:00:00.360
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	Additional Memory Required for Residual Plots	544 bytes

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Descriptive Statistics

	Mean	Std. Deviation	N
ProcessC	3.2200	.81541	50
AccidE	3.9600	.60474	50
InspE	3.7700	.75734	50
TrainE	3.2700	.77070	50
TrainC	3.3300	.84280	50

Correlations

		ProcessC	AccidE	InspE	TrainE	TrainC
Pearson Correlation	ProcessC	1.000	.432	.265	.626	.649
	AccidE	.432	1.000	.347	.494	.337
	InspE	.265	.347	1.000	.493	.337
	TrainE	.626	.494	.493	1.000	.685
	TrainC	.649	.337	.337	.685	1.000
Sig. (1-tailed)	ProcessC	.	.001	.031	.000	.000
	AccidE	.001	.	.007	.000	.008
	InspE	.031	.007	.	.000	.008
	TrainE	.000	.000	.000	.	.000
	TrainC	.000	.008	.008	.000	.
N	ProcessC	50	50	50	50	50
	AccidE	50	50	50	50	50
	InspE	50	50	50	50	50
	TrainE	50	50	50	50	50
	TrainC	50	50	50	50	50

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	TrainC, AccidE, InspE, TrainE	.	Enter

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.713 ^a	.509	.465	.59640

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.574	4	4.143	11.649	.000 ^a
	Residual	16.006	45	.356		
	Total	32.580	49			

Coefficients^a

Model	Unstandardized		Standardize	t	Sig.	95.0% Confidence Interval		Correlations			Collinearity	
	Coefficients		d			for B					Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-ord	Partial	Part	Toleranc	VIF
1	(Constan	.257	.628	.409	.684	-1.007	1.521					
	t)											
	AccidE	.235	.164	.174	1.436	-.095	.564	.432	.209	.150	.742	1.349
	InspE	-.087	.131	-.081	-.667	-.350	.176	.265	-.099	-.070	.743	1.347
	TrainE	.312	.173	.295	1.802	-.037	.661	.626	.259	.188	.408	2.454
	TrainC	.403	.139	.416	2.902	.123	.682	.649	.397	.303	.531	1.883

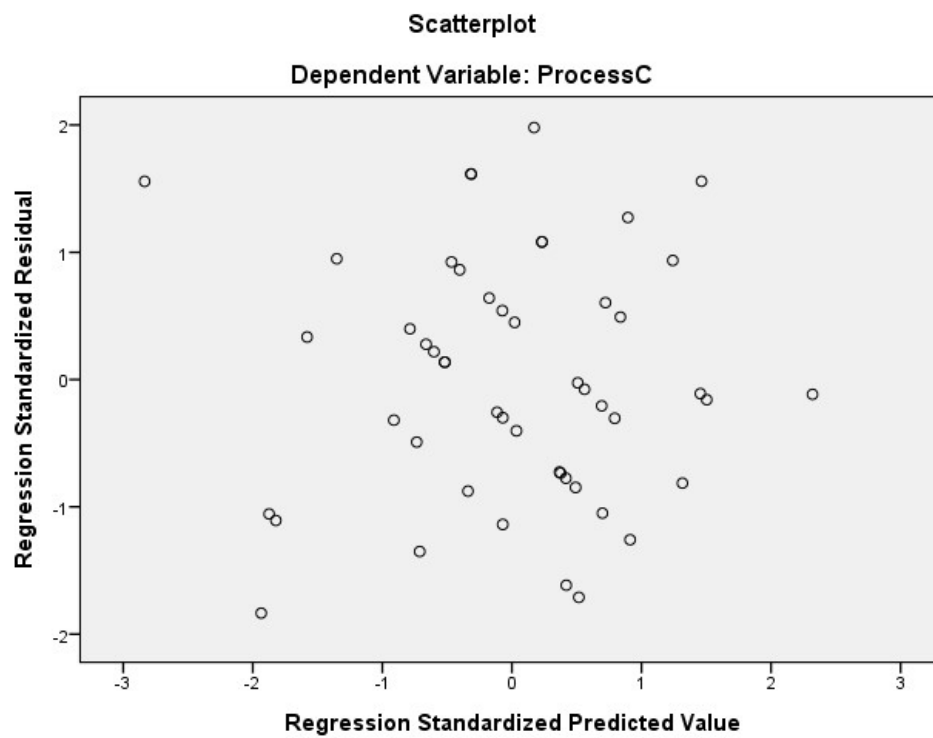
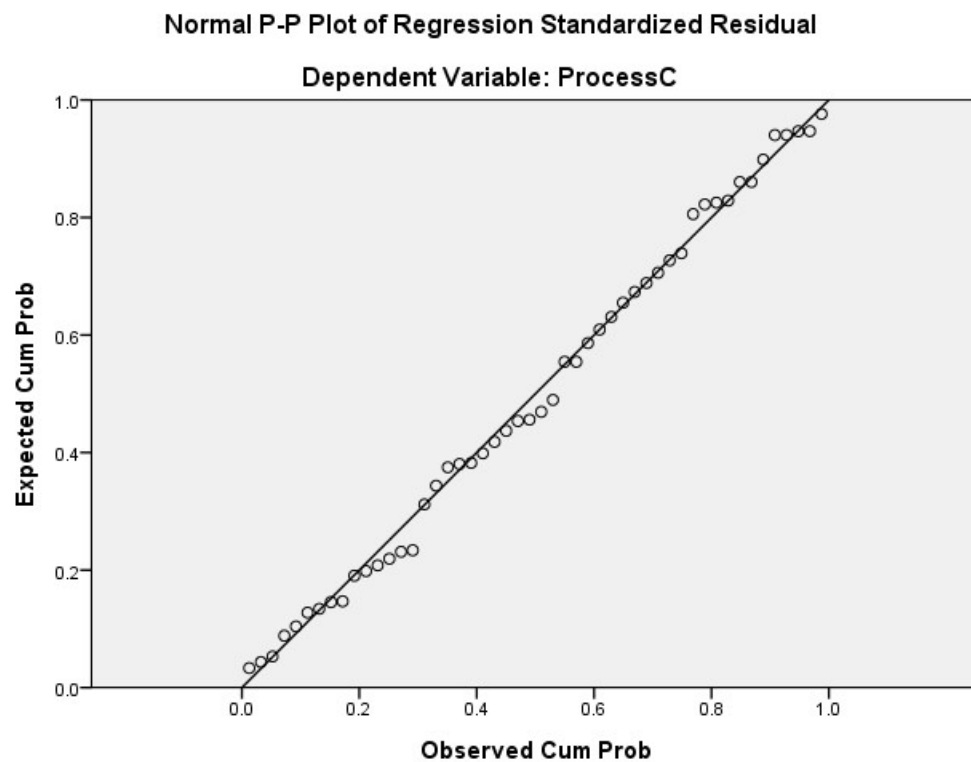
Collinearity Diagnostics^a

Model	Dimension	Eigenvalu	Condition	Variance Proportions				
				(Constant)	AccidE	InspE	TrainE	TrainC
1	1	4.908	1.000	.00	.00	.00	.00	.00
	2	.042	10.835	.08	.04	.07	.07	.35
	3	.023	14.553	.14	.10	.70	.05	.06
	4	.017	17.032	.07	.14	.15	.56	.47
	5	.010	22.614	.72	.72	.07	.31	.12

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.5712	4.5694	3.2200	.58158	50
Residual	-1.09446	1.18084	.00000	.57154	50
Std. Predicted Value	-2.835	2.320	.000	1.000	50
Std. Residual	-1.835	1.980	.000	.958	50

Charts



Stage 5

Data Controlling Log-Chi-square Analysis

[Tests about the relationships of Accident Rate Level between the Construction Nature and Manpower]

General

The stage 5 is testing Accident Rate Level of the relationship between the Construction Nature and Man Power, by using Chi-square test. The current chi-square is conducted to assess if the accident rate level has been influenced by its construction nature or manpower. The construction nature within this research is including the categories of building, civil and maintenance. Or, the accident rate level is having the association with the contract sum. The contract sum is attributing from less than 100 millions to over 3 billions. Chi-square test's crosstab expected count must fulfill 10 in each count. However, there is not a count can satisfy this criteria. The result of this statistics will be explained as follows.

Chi-square Log

1. Null Hypothesis (accident rate level vs. contract Sum): There is no association between accident rate level and contract sum.

The null hypothesis is accepted. When chi-square test has been conducted in assessing their relationship, the accident rate level has shown no sign of relationship with contract sum, $X^2(16, N=50)=13.24, p=.66$.

2. Null Hypothesis (accident rate level vs. manpower): There is no association between accident rate level and manpower.

The null hypothesis is accepted. When chi-square test has been conducted in assessing their relationship, the accident rate level has shown no sign of relationship with manpower, $X^2(12, N=50)=14.18, p=.29$.

The result has suggested that the accident rate level does not influence by both contract sum and manpower of the projects.

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  /FORMAT=AVALUE TABLES
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  /CELLS=COUNT EXPECTED
  /COUNT ROUND CELL.

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Crosstabs

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	File	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each table are based on all the cases with valid data in the specified range(s) for all variables in each table.
Syntax		CROSSTABS /TABLES=Accident_rate BY Contract_sum Manpower Business /FORMAT=AVALUE TABLES /STATISTICS=CHISQ PHI /CELLS=COUNT EXPECTED /COUNT ROUND CELL.
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[DataSet1] C:\Users\user\Documents\lsms_research_merge1.sav

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Accident_rate *	50	100.0%	0	.0%	50	100.0%
Contract_sum						
Accident_rate * Manpower	50	100.0%	0	.0%	50	100.0%
Accident_rate * Business	50	100.0%	0	.0%	50	100.0%

Accident_rate * Contract_sum**Crosstab**

			Contract_sum					Total
			under 100mil	over 100m under 500mil	over 500mil under 1 billion	over 1 billion under 3 billions	over 3 billions	
Accident_rate	Low	Count	3	4	5	1	1	14
		Expected	3.1	3.6	2.5	2.2	2.5	14.0
		Count						
	2	Count	0	2	1	2	4	9
		Expected	2.0	2.3	1.6	1.4	1.6	9.0
		Count						
	3	Count	5	6	1	4	2	18
		Expected	4.0	4.7	3.2	2.9	3.2	18.0
		Count						
	4	Count	1	1	2	1	2	7
		Expected	1.5	1.8	1.3	1.1	1.3	7.0
		Count						
	High	Count	2	0	0	0	0	2
		Expected	.4	.5	.4	.3	.4	2.0
		Count						
Total		Count	11	13	9	8	9	50
		Expected	11.0	13.0	9.0	8.0	9.0	50.0
		Count						

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.699 ^a	16	.153
Likelihood Ratio	22.065	16	.141
Linear-by-Linear Association	.162	1	.687
N of Valid Cases	50		

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal Phi	.659	.153
Cramer's V	.329	.153
N of Valid Cases	50	

Accident_rate * Manpower**Crosstab**

			Manpower					Total	
			Under 100 per month	100 but under 200 per month	200 but under 400 per month	400 but under 600 per month	over 600 per month		
Accident_rate	Low	Count	8	4	0	1	1	14	
		Expected Count	6.7	3.4	2.0	1.1	.8	14.0	
	2	Count	2	4	2	1	0	9	
		Expected Count	4.3	2.2	1.3	.7	.5	9.0	
	3	Count	10	2	3	2	1	18	
		Expected Count	8.6	4.3	2.5	1.4	1.1	18.0	
	4	Count	2	2	2	0	1	7	
		Expected Count	3.4	1.7	1.0	.6	.4	7.0	
	High	Count	2	0	0	0	0	2	
		Expected Count	1.0	.5	.3	.2	.1	2.0	
	Total		Count	24	12	7	4	3	50

Crosstab

			Manpower					Total
			Under 100 per month	100 but under 200 per month	200 but under 400 per month	400 but under 600 per month	over 600 per month	
Accident_rate	Low	Count	8	4	0	1	1	14
		Expected	6.7	3.4	2.0	1.1	.8	14.0
	2	Count	2	4	2	1	0	9
		Expected	4.3	2.2	1.3	.7	.5	9.0
	3	Count	10	2	3	2	1	18
		Expected	8.6	4.3	2.5	1.4	1.1	18.0
	4	Count	2	2	2	0	1	7
		Expected	3.4	1.7	1.0	.6	.4	7.0
	High	Count	2	0	0	0	0	2
		Expected	1.0	.5	.3	.2	.1	2.0
	Total	Count	24	12	7	4	3	50
		Expected	24.0	12.0	7.0	4.0	3.0	50.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.242 ^a	16	.655
Likelihood Ratio	16.857	16	.395
Linear-by-Linear Association	.090	1	.765
N of Valid Cases	50		

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal Phi	.515	.655
Cramer's V	.257	.655
N of Valid Cases	50	

Accident_rate * Business**Crosstab**

			Business				
			Building	Civil	Maintenance	Others	
Accident_rate	Low	Count	4	1	7	2	14
		Expected Count	5.6	2.2	5.3	.8	14.0
	2	Count	4	3	1	1	9
		Expected Count	3.6	1.4	3.4	.5	9.0
	3	Count	8	4	6	0	18
		Expected Count	7.2	2.9	6.8	1.1	18.0
	4	Count	4	0	3	0	7
		Expected Count	2.8	1.1	2.7	.4	7.0
	High	Count	0	0	2	0	2
		Expected Count	.8	.3	.8	.1	2.0
Total		Count	20	8	19	3	50
		Expected Count	20.0	8.0	19.0	3.0	50.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.183 ^a	12	.289
Likelihood Ratio	17.214	12	.142
Linear-by-Linear Association	.665	1	.415
N of Valid Cases	50		

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal Phi	.533	.289
Cramer's V	.307	.289
N of Valid Cases	50	

Chapter 4-Result

Data Control Log

Introduction

Chapter four has concluded the questions and responses from the LOSMS Questionnaire constituted with 64 LOSMS questions, plus 7 situational questions. Situational questions are explicit the matter, such as contract sum and project manpower. The analysis is divided into 5 stages. A flow chart explained to give full vision of each stage. Also, Coverage, with replica of anal sizing information, will be placed over the technical calculation for convenience perusal

As the research data of the LOSMS 16 elements attributed 64 data, which is differentiated into 4 questions (within the research questionnaire) in each LOSMS element, asking in two aspects (company support and employee involvement). They need to merge together into 32 data, by one element possess 2 data representing 2 aspects. This is stage 1 by using individual T-test. Those 32 data will go through Principle Component Analysis (PCA) to discover significant variables, stage 2. Since, Accident Rate Level is in Ordinal nature, MANOVA analysis is used to find out the relationship between Accident Rate Level and other indicators. The model construction is established in stage 4 by Multiple Regression Analysis. Stage 5 is Chi-square test for anglicizing contract sum and manpower associated with accident rate level.

Research Stage 1 (Variance and homogeneity assessment prior the merging)

Since the data field included 64 variables questioning about the 16 elements of Legislative Safety Management System, in both aspects of company support and employee's involvement. Those 64 variables will be examined its variances and homogeneity if they are in the same nature, and are eligible for aggregate together. Thus, descriptive statistics of the variables would be contented in the data analysis in subsequent pages for in depth observation, including mean, variances, and histogram that shown its normal distribution. Individual t-test (Levene's test) will be conducted to potential variables would be used to reduce into 32 variables. The first merging variables would be explained details its properties in essay below. The remaining will be summarized in table 1.

Merging Log

The Policy E1 group (N=50) is associated with LSMS elements that $M=3.62$ ($SD=.90$), while the Policy E2 group (N=50) is having $M=3.18$ ($SD=.98$). Testing the hypothesis that Policy E1 and E2 have no statistically significant difference between two variables for aggregate intention, an independent t-test was performed. As there can be seen in the enclosed histograms; Policy E1 and E2 are both in normal distribution for the purpose of conducting T-test (i.e., skew<12.01 and Kurtosis<10.91; Schmider, Ziegler, Manny, Beyer, & Buhmer, 2010). Additionally, the assumption of homogeneity, of variances are tested and satisfied through Levene's test, $F(13)=1.78$, $P=.21$. Thus, the independent sample t-test has proved without statistically significant different effect, $t(13)=-.79$, $P=.45$.

The Policy E1 and E2 are associated without any difference between two groups that hypothesis cannot be rejected. And, the remaining variables are having same approach as shown in Table T1.

Table T1: summary of t-test result

Variables	Levene's Test		t	sig (2-tails)	Hypothesis
	F	P(sig)			Rejected or no
Policy E1 & E2	1.78	.20	-.79	.45	no
Policy C1 & C2	2.20	.14	.42	.14	no
OrgE1 & E2	2.20	.14	1.90	.06	no
OrgC1 & C2	.18	.68	1.76	.08	no
AccidE1 & E2	.51	.48	1.07	.29	no
AccidC1 & C2	3.12	.08	-.12	.91	no
InspE1 & E2	3.01	.09	.57	.57	no
InspC1 & C2	.75	.39	4.00	.07	no
SubconE1 & E2	.98	-.33	-2.8	.78	no
SubconC1 & C2	.00	.99	-1.84	.07	no
ProcessE1 & E2	3.86	.05	-.36	.72	no
ProcessC1 & C2	.05	.82	-.86	.39	no
TrainE1 & E2	.23	.63	.56	.58	no
TrainC1 & C2	.36	.55	-.98	.05	no
MeetingE1 & E2	1.18	.28	1.1	.28	no
MeetingC1 & C2	.18	.67	-.11	.91	no
PromotionE1 & E2	1.22	.27	1.43	.16	no
PromotionC1 & C2	.72	.68	1.28	.20	no
HazardE1 & E2	.18	.67	.20	.84	no
HazardC1 & C2	.05	.82	.20	.84	no
PpeE1 & E2	1.16	.29	3.23	.23	no
PpeC1 & C2	.14	.71	-1.70	.09	no
RuleE1 & E2	.01	.93	1.17	.24	no
RuleC1 & C2	2.06	.16	.73	.47	no
HealthE1 & E2	7.85	.01	.61	.44	no
HealthC1 & C2	3.3	.07	-1.32	.19	no
PerformE1 & E2	.64	.43	.21	.83	no
PerformC1 & C2	.15	.70	.99	.33	no
DocE1 & E2	1.84	.18	2.59	.11	no
DocC1 & C2	.13	.72	1.13	.26	no
EmergencyE1 & E2	.32	.57	1.6	.11	no
EmergencyC1 & C2	1.50	.22	-.89	.38	no

Research stage 2 (Usage of the Principle Component Analysis Method)

Merged Variable Screening: After the merging process through Individual Sample t-test, the database has been merged up 64 variables into 32 variables. The amount of data for Critical Component Analysis was satisfied with the data size of 1600, with 50 cases per variable.

Component Extraction Log: Firstly, the factorability of 32 variables is examined. The amount of well-recognized criteria for testing the correlation is implied. During the initial period (see PCA_PageB1 to PageB5), there is no KMO and Bartlett's Test result provided. Unfortunately, the determinant level=.000 that shown below the diagonals of the anti-image correlation matrix. However, the communalities are all above .59. It further explained to us that the questionnaires are easily understood by the target population. The undermined variables are well be manipulated with substantial feedback information. The initial results of chapeau analyzing 32 merged variables cannot discover any successful development, not a positive definite in the correlation matrix.

Principles Components Analysis (PCA) are undergoing by reducing its irrelevant variables again and again. Until the final 9 variables are discovered (see PCA2, Page1-5), the first eigen values above 1 have indicated the first component explained 48% of the variances. The second component explained 16% of the variances. There is the 'level off' of eigen value on the scree plot after two components discovered. The subsequent variables have lacked its sufficiency of fundamental loadings. There are weaknesses of interpreting the other components. Those variables of insufficient of cross-loading below 0.3 are eliminated. Finally, there are 9 variables remained out of 32, with the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.78, above the suggesting value of 0.6. The Bartlett's test of sphericity is significant ($\chi^2(36) = 203.72$, $P < .5$). The determinant of correlation matrix is 0.24 which is larger than 0.01. The diagonals of correlation matrix are all over 0.3 supporting the item's inclusion of factor analysis.

The Table T2 established a summary of the variables' relationship loading and communalities, which is based on PCA with oblimin rotation for 9 variables (N=50) as shown below:

Table T2: Summary of principle variables' correlation and communalities

Principle Variables	Co_performance	Co_support	Ec_Ssat	Communality
AccidE	.42	.32	.27	.46
TrainE	.47	.50	.41	.78
TrainC	.44	.42	.37	.62
Co_performance	1.00	.47	.49	.46
Co_support	.47	1.00	.64	.79
Ec_Ssat	.49	.64	1.00	.67
OrgC	.31	.65	.39	.53
ProcessC	.38	.63	.47	.65
InspE	.12	.01	-.09	.80

Those 9 variables have already been assessed by Independent sample t-test in stage 1. They are all in normal distribution. Their descriptive statistics is displayed in Table T3:

Table T3: Descriptive statistics for the 9 variables (N=50)

Principle Variables	Mean	Std. Deviation
AccidE	3.96	.60
TrainE	3.27	.77
TrainC	3.33	.84
Co_performance	3.22	.76
Co_support	3.12	.90
Ec_Ssat	3.20	.80
OrgC	3.37	.77
ProcessC	3.22	.82
InspE	3.77	.76

As the result, PCA has indicated the remaining 9 variables to establish the forthcoming model construction. These variables are moderately internal consistent. Although the oblimin rotation was used, those other 23 variables with small correlations, within each of the composite loading, are eliminated.

Research stage 3 (MANOVA Analysis)

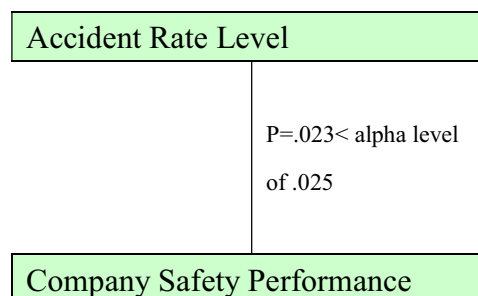
Since, the Accident rate, using in the research questionnaires, is ordinal nature. MANOVA is going to examine the relationship between the accident rate level and both Co_performance and Co_support. The Levene's test for homogeneity of variance is not significant. As a result, the multivariate testing found with the significant effect on company safety performance to accident rate level, see diagram 1. Contrary to our estimation, there no trace of relationship between accident rate and Company support on safety aspect.

Multivariate Analysis of Variance Log

There was no difference between accident rate levels of evaluation when considered jointly on both Co_support and Co_performance, Wilk's $\Lambda = .715$, $p = .055$, $F(8,88) = 2$, Partial $\eta^2 = .15$.

Separate ANOVA is conducted for the dependent variable (accident rate level) with each ANOVA evaluated as an alpha level of .025. There is a significant relationship between accident rate level and Co_performance, $F(4, 45) = 3.15$, $p = .023$, Partial $\eta^2 = .22$. There is no significant relationship between accident rate level on Co_support, $F(4, 45) = 1.07$, $p = .38$, Partial $\eta^2 = .09$.

diagram 1



Research stage 4 (Multiple Regression Analysis)

The stage 4 analyses have taken place by using correlationship and multiple regressions for restructuring the model. The Company Safety Performance, as dependant variable, using in the research questionnaires, is measure in scale. Regression is going to examine the relationship between Co_performance, Co_support and various indicators. Through the Regression 1 to 5 enclosed, a restructured Model 10 Element from LSMS (16 elements) is constituted, Diagram 1 to 6. The LSMS elements will be undergone through 5 individual regressions in order to reach the model restructure purpose.

Multiple Regression Log

Regression 1 has displayed the examination result between Co_performance and Co_support. Table T4 has indicated the Co_support scores result, with positively and significantly correlated to the criterion. The multiple regression model with the variable (Co_support) constituted $R^2=.22$, $F(1,28)=13.46$, $p<.01$. Diagram 2 has depicted the scenario of Co_performance and Co_support.

Diagram 2

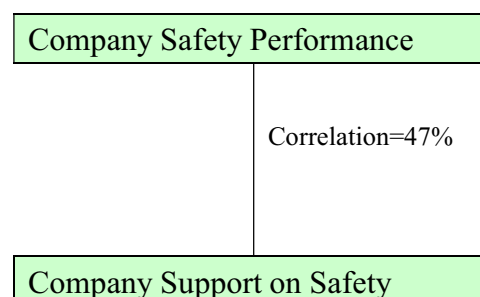


Table T4, Co_support has contented the significant positive regression weight, with the meaning that Co_support is influencing a company's safety performance.

Variable/s	Mean	Std	Correlation (Part)	Multiple Regression Weights	
				b	
Co_performance	3.22	.76			
Co_support	3.12	.90	.47**	.34**	.47

Table T4 Summary statistics and results from the regression 1 analysis

*p<.05 **p<.01 ***p<.001

Regression 2 has displayed the examination results between Co_support and various predictors. Table T5 has indicated the Co_support scores result, with positively and significantly correlated to both OrgC and ProcessC. The multiple regression model with the variable (co_support) constituted $R^2=.68$, $F(7, 42)=12.82$, $p<.001$.

Diagram 3

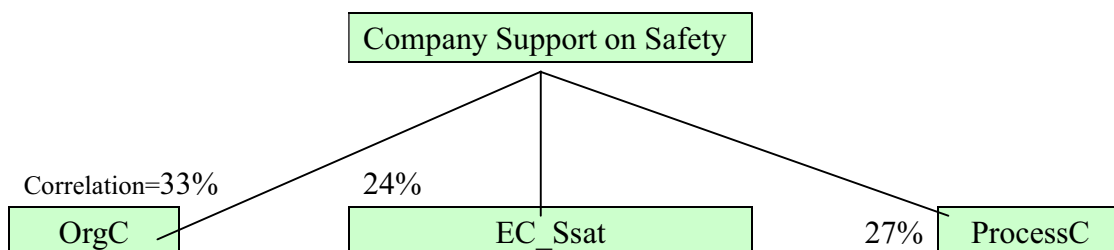


Table T5, Co_support has contented the significant positive regression weight, with the meaning that Co_support is influencing OrgC, EC_Ssat and ProcessC.

Variable/s	Mean	Std	Correlation (Part)	Multiple Regression Weights	
				b	
Co_support	3.12	.90			
OrgC	3.37	.77	.33**	.47**	.42
AccidE	3.96	.60	-.08	-.16	-.1
InspE	3.77	.76	-.02	-.03	-.02
ProcessC	3.22	.82	.24**	.40**	.36
TrainE	3.27	.77	.01	.03	.03
TrainC	3.33	.84	-.02	-.03	-.03
EC_Ssat	3.20	.81	.27**	.37**	.34

Table T5 Summary statistics and results from the regression 2 analysis

*p<.05 **p<.01 ***p<.001

Regression 3 has displayed the examination results between OrgC and various predictors. Table T6 has indicated the OrgC scores result, with positively and significantly correlated to both AccidE and TrainE. The multiple regression model with the variable (co_support) constituted $R^2=.38$, $F(5, 44)=5.30$, $p<.01$.

Diagram 4

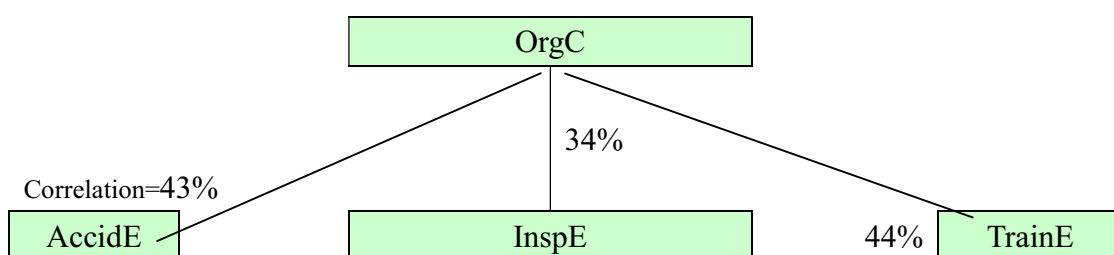


Table T6, OrgC has contented the significant positive regression weight, with the meaning that OrgC is influencing by AccidE and TrainE.

Variable/s	Mean	Std	Correlation (Part)	Multiple Regression Weights	
				b	
OrgC	3.37	.77			
AccidE	3.96	.60	.29*	.43*	.34
InspE	3.77	.76	-.28*	-.34*	-.33
ProcessC	3.22	.82	.10	.14	.14
TrainE	3.27	.77	.27*	.44*	.44
TrainC	3.33	.84	-.08	-.11	-.12

Table T6 Summary statistics and results from the regression 3 analysis

*p<.05 **p<.01 ***p<.001

Regression 4 has displayed the examination results between Ec_Ssat and various predictors. Table T7 has indicated the Ec_Ssat scores result, with significantly correlated to InspE. The multiple regression model with the variable (Ec_Ssat) constituted $R^2=.37$, $F(6, 43)=4.13$, $p<.01$.

Diagram 5

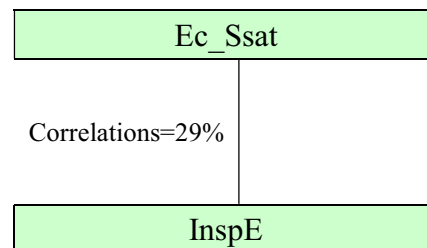


Table T7, Ec_Ssat has contented the significant regression weight, with the meaning that Ec_Ssat is influencing by InspE.

Variable/s	Mean	Std	Correlation (Part)	Multiple Regression Weights	
				b	
Ec_Ssat	3.20	.81			
OrgC	3.37	.77	.08	.10	.10
AccidE	3.96	.60	.04	.07	.05
InspE	3.77	.76	-.29*	-.38*	-.36
ProcessC	3.22	.82	.19	.28	.28
TrainE	3.27	.77	.19	.34	.32
TrainC	3.33	.84	.03	.04	.04

Table T7 Summary statistics and results from the regression 4 analysis

*p<.05 **p<.01 ***p<.001

Regression 5 has displayed the examination results between Process and various predictors. Table T8 has indicated the ProcessC scores result, with significantly correlated to TrainC. The multiple regression model with the variable (Ec_Ssat) constituted $R^2=.51$, $F(4, 45)=11.65$, $p<.001$.

Diagram 5

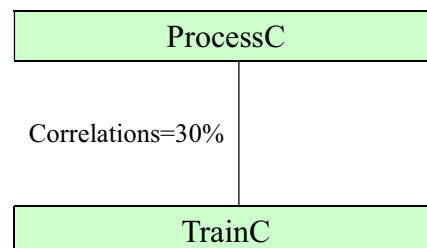


Table T8, ProcessC has contented the positive significant regression weight, with the meaning that ProcessC is influencing by TrainC.

Variable/s	Mean	Std	Correlation (Part)	Multiple Regression Weights	
				b	
ProcessC	3.22	.82			
AccidE	3.96	.60	.15	.10	.10
InspE	3.77	.76	-.07	.07	.05
TrainE	3.27	.77	.168	-.38	-.36
TrainC	3.33	.84	.30**	.28**	.28

Table T8 Summary statistics and results from the regression 5 analysis

*p<.05 **p<.01 ***p<.001

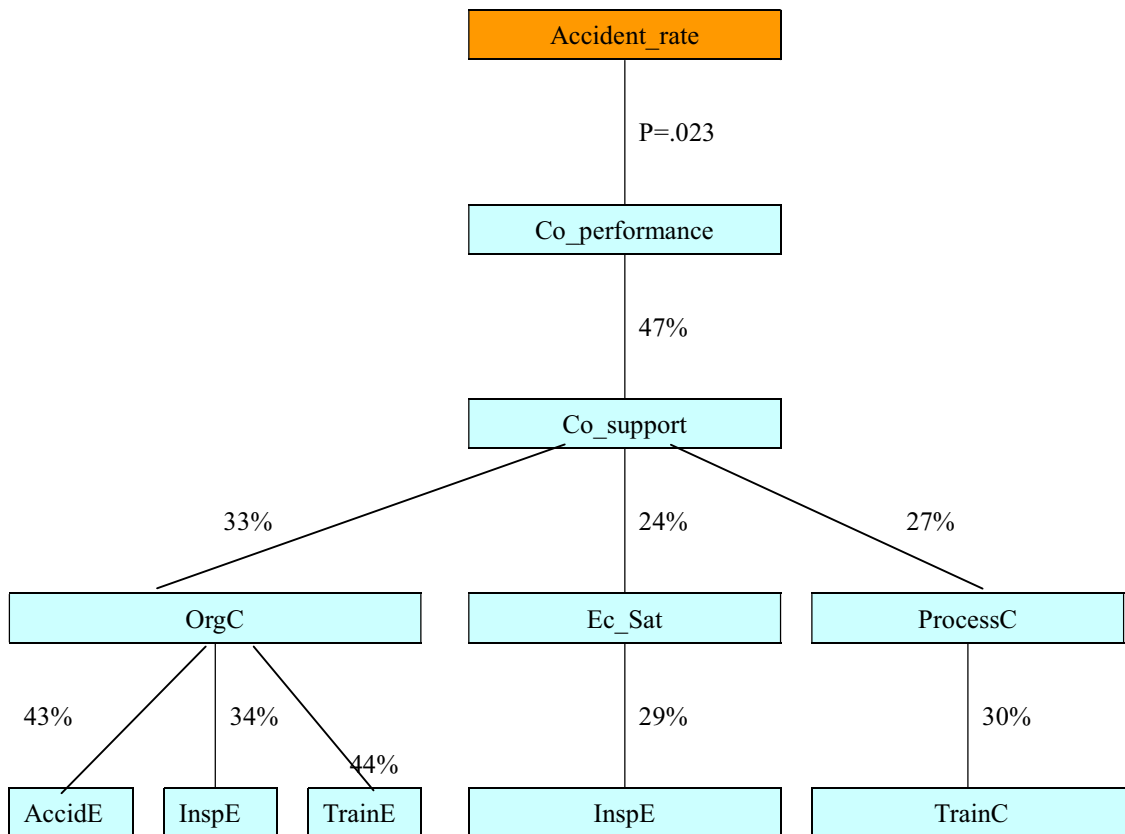


Diagram 6: The Rebuilt of the Model 10 Elements from the Initiated LSMS (16 Elements)

Research stage 5 (Chi-square Analysis)

Tests about the relationships of Accident Rate Level between the Construction Nature and Manpower: The stage 5 is testing Accident Rate Level of the relationship between the Construction Nature and Man Power, by using Chi-square test. The current chi-square is conducted to assess if the accident rate level has been influenced by its construction nature or manpower. The construction nature within this research is including the categories of building, civil and maintenance. Or, the accident rate level is having the association with the contract sum. The contract sum is attributing from less than 100 millions to over 3 billions. Chi-square test's crosstab expected count must fulfill 10 in each count. However, there is not a count can satisfy this criteria. The result of this statistics will be explained as follows.

Chi-square Log

1. Null Hypothesis (accident rate level vs. contract Sum): There is no association between accident rate level and contract sum.

The null hypothesis is accepted. When chi-square test has been conducted in assessing their relationship, the accident rate level has shown no sign of relationship with contract sum, $X^2(16, N=50)=13.24, p=.66$.

2. Null Hypothesis (accident rate level vs. manpower): There is no association between accident rate level and manpower.

The null hypothesis is accepted. When chi-square test has been conducted in

assessing their relationship, the accident rate level has shown no sign of relationship with manpower, $X^2(12, N=50)=14.18, p=.29$.

The result has suggested that the accident rate level does not influence by both contract sum and manpower of the projects.

Flow Chart of Data Analysis

Stage 1: Variables Merging

Since the research questionnaire contented 64 data for 16 LSMS elements have been asked in different directions, Levene's Test has conducted to assess variances and homogeneity for merging preparation (suitability of integrated to 32 data).

Stage 2: Influencing Component Extraction

Those most significant LOSMS elements would be screened out through Principle Component Analysis for consequential model construction.

Stage 3: MANOVA Analysis

The accident rate level is being examined its relationship between remaining elements after the stage 2 screening. The element, Company Support on Safety has been discovered its distinguished relationship, afterwards.

Stage 4: Multiple Regression Analysis

The remaining predictors are being distinguished their relationship in between, for model restructuring. Model is formulated.

Stage 5: Chi-square Test

Statistics test about the association between accident rate level, contract sum and manpower.

Chapter 5-Discussion

Introduction

The legislative occupational safety management system (LOSMS) over Asia can be identified as under the influential of one or not more than 16 elements on safety aspect. Some of the countries, such as China and Hong Kong, have adopted and developed the auditing system respectively. There seem not given any substantial help to enhance safety performance. This paper is arguing that the above performance measuring elements, adopted into auditing system in number of elements in different but complementary perspectives, are far too adequate for Hong Kong construction business nature. These elements should be chosen to put in force according to the countries' production nature. The fundamental and most critical elements should be differentiated out for reference, as the direction for basis constitution of safety management system. Otherwise, they will not perform well, and not affordable for local organizations. An unaffordable solution is not a solution.

Despite there come growing number of safety management literature, those elements are recognized its necessities and inter-related, safety performance related. However, there is limited information of how critical the elements LOSMS are affecting safety performance. Even, the interaction of elements is seemed to be ignored. Upon the LOSMS elements, this paper is hoping to provide the better understanding of their importance and inter-dependence between them.

Chapter four has concluded the questions and responses from the LOSMS Questionnaire constituted with 64 LOSMS questions, plus 7 situational questions. Situational questions are explicit the matter, such as contract sum and project manpower. The analysis is divided into 5 stages. A flow chart explained to give full vision of each stage. Also, Coverage, with replica of anal sizing information, will be placed over the technical calculation for convenience perusal

As the research data of the LOSMS 16 elements attributed 64 data, which is differentiated into 4 questions (within the research questionnaire) in each LOSMS element, asking in two aspects (company support and employee involvement). They need to merge together into 32 data, by one element possess 2 data representing 2 aspects. This is stage 1 by using individual T-test. Those 32 data will go through Principle Component Analysis (PCA) to discover significant variables, stage 2. Since,

Accident Rate Level is in Ordinal nature, MANOVA analysis is used to find out the relationship between Accident Rate Level and other indicators. The model construction is established in stage 4 by Multiple Regression Analysis. Stage 5 is Chi-square test for anglicizing contract sum and manpower associated with accident rate level.

Overview of the Problems

The research literature has observed the legal issues on safety, and summed up there is an existing of 16 LOSMS elements within Asian legislative system, in order to suit their demographical and economical nature. And, Hong Kong has already contented 14 elements amount the 16. However, there is scarce research to retaliate the sufficiency of those 14 elements are improving accident rate. Despite attempts to attribute the indigenous legislative audit system for sizing the organizational safety performance, there in fact no empirical research to substantiate the relation of the elements with accident rate. Thus, we can take another step to discover what elements is the priority to enhance safety performance. What factors attributed within the significant elements that may invigorate higher accident rate if not properly handle? Is our local auditing system effective, finally?

In following pages, there will be further explanation of those distinguisher elements resulted from chapter 3 & 4 for easy understanding of the discovery.

Interpretation of those Significant LOSMS Elements

Chapter 4, statistics results has concluded that the accident rate is related to safety performance through the leverage of company support, under those elements influence. The diagram 6 in Chapter 4 has explained the critical LOSMS elements as follows:

1. Safety Organization Establishment (OrgC)
2. Process Control (ProcessC)
3. Safety Training (TrainE + TrainC)
4. Inspection (InspE)
5. Accident Prevention (AccidE)

There needs to further explicit their definition through code of practice and fundamental theory basis.

Safety Organization is interpreted as the setup of structure to make sure a thorough implementation of safety and health at work (Labour Department, 2002). This establishment is for convenience of taking process in formulates relationships

between people and resources within the company for the task. Through this issue, occupational safety and health must build in to all industrial undertaking, not matter its size or work nature. There should be sufficient budget to maintain the safety management system works. The organization shall make sure the safety policy and plan in practice effectively, assign personnel to responsible the safety and health matters. Safety committee shall be formulate and operate effectively. The organization shall take necessary steps to make sure employee to carry out their responsibility in safety matters. Top management shall be the one as leader to involve into safety management system through this organization. The organization shall arrange dissemination of relevant safety information, receiving routine specialist advice, employees to attend safety and health activities, conducting job-related safety training.

Moreover, Brech (1965) has once mentioned organizations are the structure formed by people for conducting management process. The definition is intricate with the organization feature of purpose, people and structure. Stewart (1994) has defined organization establish for overcoming the task that individuals cannot accomplish alone. Organization is having characteristics of complexity.

In this sense, **Safety Organization (OrgC)** in this paper is defined as a formal structure formed by individual together for taking process in formulate relationships between people and resources within the company for the safety task. Through this issue, occupational safety and health must be built in to all industrial undertaking, not matter its size or work nature.

Process Control can be found the labeled element in Code of Practice on Safety Management (Labour Department, 2002). However, the thirteenth elements written as ‘A programme for accident control and elimination of hazards before exposing workers to any adverse work environment’ is defined in the same sense with Process Control. The element is identified as a process control programme targeted for sorting out occupational safety and health risks, hoping to control risk through safe working procedures. The program should consider with all the possible impact of all undergoing process in the matter of enhancing the effectiveness of safety and health risk reduction. This process control program should possess the crucial component as follows:

1. Provision of process safety information
2. Process hazard analysis
3. Operating procedures
4. Training and competency of workers

5. Mechanical integrity programme

When we talk about process, there is always a link with F.W. Taylor and scientific management (Boddy, 2014). The 19th century United States industrialization needs to have standardization of solve the problems of scarcity of skillful workers, uneven product quality, efficiency in production and etc. Taylor and his believers have raised the idea of rationalism. In Taylor's opinion, there should rules and procedures of works to eliminate uncertainty with predictability.

In this sense, **Process Control (ProcessC)** in this paper is defined as formal systematic working rules and procedures are formulated to eliminate potential safety and health risk or uncertainty with predictability. Those written rules and procedure should attribute with sufficient safety information, safe operating procedures, information suitability for safety training and its review.

Safety Training is the means that help workers to receive skills, knowledge and improve their safety sense in order to make them more competence for performing their job in safety aspect. Safety training should be relevant to the process and with necessities on all level. Training program should be available for easy adjustment of unsafe behavior and evaluation of its effectiveness.

Training can be attributed into four aspects (Cole & Kelly, 2004); it is an intervention to improve ones knowledge and skills; a means that is best to ones growth in ability, skills, self-confidence, interpersonal skills and self-control; a means to acquire knowledge of how to make use of working environment to improve performance.

In this sense, Safety training can be defined as an intervention to improve ones safety knowledge and skills. It also a means which provide the best way for ones growth in ability to avoid unsafe acts, self-confidence to report unsafe condition, interpersonal skill to organize workplace improvement and self-control of not breaching the safety rules. Safety training is having two folds in this paper. Organizational support is to develop strategy, for conducting related safety training program, to invigorate the above four aspects (**TrainC**). Employee willingness to support the safety training is fulfilling the four aspects (**TrainE**).

Inspection is mentioned as an inspection programme to sort out the hazardous areas and rectify such outstanding at regular basis appropriately, according to the Code of Practice on Safety Management (Labour Department, 2002). The programme shall

take all risk count as a matter. The programme is the effective means of measuring the safety performance in two areas:

1. To achieve the safety objects and standard compliance.
2. To prevent accident.

According to The Collaborative International Dictionary of English v.0.48 [guide], Inspection is interpreted as the process of looking carefully; an examination; close monitoring or investigation.

Safety Inspection (**InspE**) is defined in this paper as inspection programme, under the support and initiate by employee, to examine those hazardous areas. Those employee are willing to cooperate with organization and self-initiative to help rectify such outstanding at regular basis.

Accident Prevention is reactive monitoring element that is devised for after accident or incident the Code of Practice on Safety Management (Labour Department, 2002). Consequently, the matters investigated that trace the cause/weakness of the system, disturbance of the safety performance should be reported and identified. Those information should be collected as evidence, be supported for forthcoming improvement and review of safety system. Finally, the substantial action can lead to reduce accident.

Generally say, accident can be interpreted as unplanned and unexpected outcomes invigorate injury, ill health, death and other damages, or any combination thereof. We collect the information of the outcomes to improve the safety system based on learning from it.

Accident Prevention (**AccidE**) in this paper is defined as a programme of preventing unplanned and unexpected outcomes, invigorate injury, ill health, death and other damages, or any combination thereof. And, organizational staff should be in anyway cooperating to the accident investigation in order to help find the prime cause of accident. The staff should follow rules that formulate after the preventive measure learning from the accidents, willing to report same unsafe act or condition to the organization. The companies foster the employee safety practice learnt from the accident. Employee

Interpretation of Other Variables

Other than those significant LOSMS elements, there are other variables, not derived from LOSMS elements, which help to mention the full view of the research. They are accident rate level (Accident_rate), company safety performance (Co_performance), organizational support (Co_support), employee satisfaction to workplace environment (Ec_Sat). The interpretations are as follows:

No.	Variables	Interpretations
1.	Accident rate level (Accident_rate)	The level of unplanned event which lead to high or low statistical result of accidents.
2.	Company safety performance (Co_performance)	Generally, the safety performance is directly linking to accident statistics to label the organizational performance. The consideration of this paper is different; The organizational performance is indicating the overall performance by evaluate its level through the combination of the discovered significant LOSMS elements and variables.
3.	Organizational support (Co_support)	The degree of the organization put forth how much resources, manpower or values provided to matter her safety.
4.	Employee satisfaction to workplace environment (Ec_Sat)	This is a new term. The degree of the employee satisfaction to the working environment the organization provided to them on safety aspects (quality of working life on safety).

Table B01

Overview of the Findings

The discovery of this research paper, taken data from indigenous safety professionals, based on summary of legislative requirement (as shown in the Chapter Two, literature review) of Asia and one or two developed countries has contented the 16 LOSMS existed. Within these 16 elements, the research analysis has introduced the new model (SMX Model) Diagram 6:

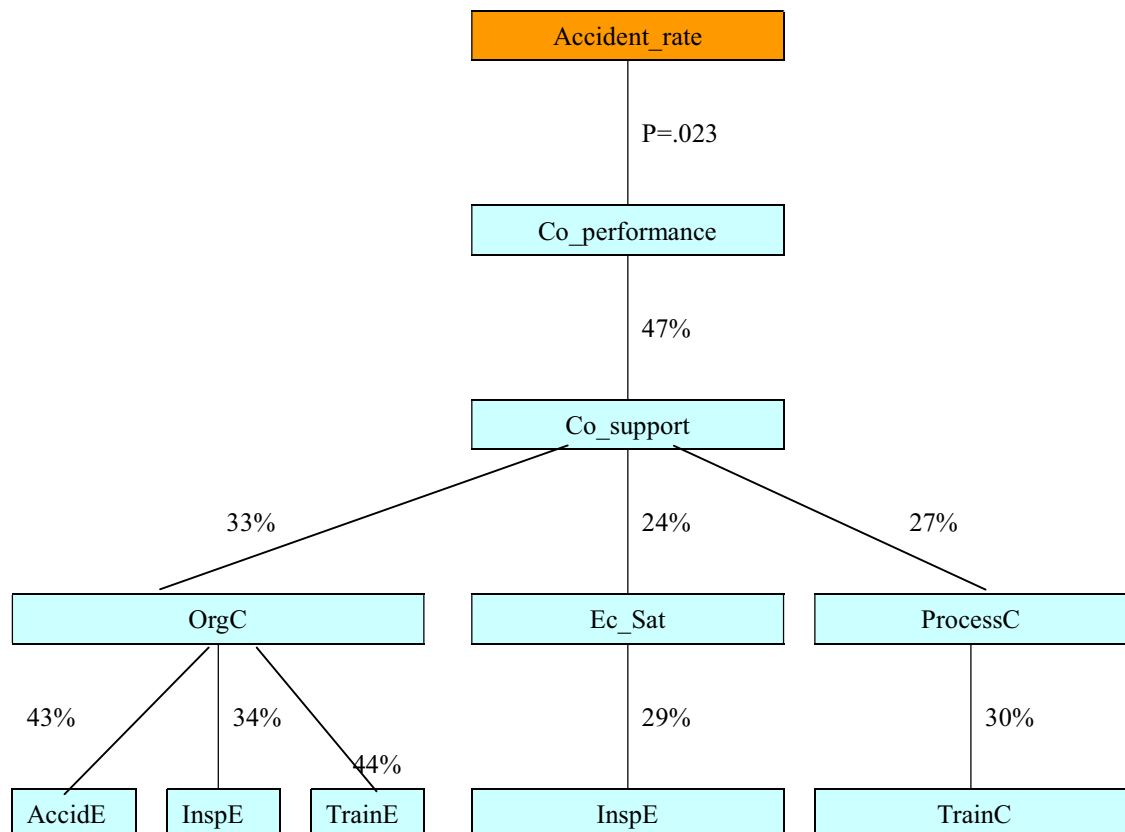


Diagram 6: The Rebuilt of the Fundamental SM Model elaborated from the Initiated LOSMS (16 Elements)

The new model gives us a new perspective of the future development organizational safety system, which reduce accident rate. The model argues there comes up three fundamental factors a company has no alternative but to absolutely support; they are:

1. Formal Safety Organization Establishment
2. Quality of Working Life on Safety
3. Process Control

Beneath these three fundamental factors, those factors have their own basic function. The formal organization must possess the function of fostering the employee safety

practice learnt from accident. The safety organization should lead staff in anyway cooperating to the accident investigation in order to help find the prime cause of accident. The staff should follow rules that formulate after the preventive measure learning from the accidents, willing to report same unsafe act or condition to the organization. The companies foster the employee safety practice learnt from the accident. The organization should establish and maintained inspection programme. The safety organization should seek for the support of employee, to examine those hazardous areas (a kind of interaction). Those employee are willing to cooperate with organization and self-initiative to help rectify such outstanding at regular basis. The organization must constitute regular training programme that the staff find appropriate to learn.

Quality of working life is the new term in this paper. The statistical research finds that one of the 3 fundamental factors combinations has a strong link with the company support. And, it is influenced by Safety Inspection (**InspE**). The phenomenon is reflecting the employee's willingness; self-initiative to help examine and rectify potential hazardous area is the factor. The factor can create better Quality of Working Life, item 4 of Table B01. In the other word, the employee's belief to have better Quality of Working Life, or physical safety workplace is when employee having safety sense to review / examine their own workplace during the job.

Process Control is major factor that the organization must support to constitute working procedure, or method statement of the process. The working related procedure must constitute with safety measure. The procedure must be easy understanding by frontier staff. Safety training to the working staff must direct safe working relate to the information of the procedures.

To this point, the paper is determining to suggest safety professional may concern to put effort on the following factors, if you do not know which way to go in the company of not having safety system about to setup:-

1. Safety Organization
2. Process Control Programme
3. Inspection Programme
4. Training Programme
5. Accident Prevention Programme

The approach may be the primary structure of safety system an organization should have. As for how sophisticate the company system should have developed, it should

see what physical environment of the process the company facing. As far as the statistical research has provided the information, the model has no relationship with contract sum and manpower. These are prime elements of the safety system. The approach may have argued that the safety management system is just sub-system of the organizational management system. The statistical result indicated there is no place relationship with safety policy. The personal perspective is interpreting as the safety should have contented within organizational policy. Safety management system should be foster under the support of organization, in order to gain safety performance. The safety management itself do not possess the issues, such as strategy setting, Porter's PESTEL framework or marketing mix, a traditional organizational management system should have. Safety management system is a close system dealing with potential hazard devised from the interaction of process and physical environment. However, safety management system performance does have substantial impact on organizational performance and profit.

The SMX model has suggested the legislative system governing safety matters, in countries, should at least consist the mentioned five factors, or call it OPTIA factors:

1. Safety Organization
2. Process Control Programme
3. Inspection Programme
4. Training Programme
5. Accident Prevention Programme

TableAZ03 has explicated of implementation condition of factors in the countries. There found only England's LOSMS is consisting those 4 factors without Accident Investigation of SM model. Although Hong Kong has implemented a quite completed system, she is still lacking a Process Control Factor, China with Training missing. Japan, developed country in Asia, she is missing Inspection and Accident Investigation. On the whole, there are no countries who have fully implemented factors of SM model in legislative aspect.

Of course, this is ones perspective to explain the discovered SM model of OPTIA factor. There needs more researches of more evidences for further support.

TableAZ03: 16 elements of the Legislative Elements of LOSMS in Different Asian Countries

No	Legislative Elements	Hong Kong	Malaysia	England	China	Taiwan	Thailand	Japan	Singapore	Philippine	Elements Popularity
1	Safety Policy										6/9
2	Organization										7/9
3	Training Program										3/9
4	In-house Rule and Safety Procedure										4/9
5	Inspection Program										6/9
6	Personal Protective Equipment Program										1/9
7	Accident Investigation Program										4/9
8	Emergency Program										5/9
9	Subcontractor Evaluation and Control										2/9
10	Safety Committee										7/9
11	Pro-active Hazard Control										7/9
12	Safety and Health Awareness										4/9
13	Occupational Health Awareness Program										4/9
14	Process Control										6/9
15	Performance Evaluation Program (Audit)										5/9
16	Documentary Control										3/9
Total Legislative Elements Usage		14	6	12	12	5	6	7	7	6	

Conclusion

With reference to the overview of Asian Legislative system on safety aspect, there sum up with 16 elements as seen in the TableAZ03. Country like England has her long history founded the safety system since 1802. Her safety system has influenced Hong Kong with 33 sets of subsidiary under the Factories and Industrial Undertakings Ordinance. In 2002, Hong Kong Safety Management Regulation has proclaimed safety management system consisted with 14 elements. China, in recent years, has adopted the OHSAS18001 system in order to keep pace with her industrial development. Taiwan is influenced by United States safety system. Japan Legislative system on safety is concentrating on process embedded with safety precautions. Philippine national income is mainly based on agricultural, fatalities come from construction and mining industry. Although her Legislative system is relatively simple comparing other developed countries, she still constitute the law pinpoint to Inspection, process control and accident investigation.

This paper defined those summed up 16 elements sort out from countries' legislative system as 16 Legislative Occupational Safety Management System Elements (16 LOSMS elements). Through the 5 stages statistical analysis, the research has discovered 5 influencing factors within these 16 LOSMS elements. Or, we call OPTIA factors in this paper. These five factors are major components that they would affect the accident rate level indirectly. On the other hand, there is a term, employee satisfaction on safety (Ec_Sat) which has strong relationship with safety inspection programme (InspE), supported by employees. However, it is interesting that statistical analysis provided that safety inspection programme (InspE) must go through Ec_Sat to have the relationship with the other variable (Co_support). Same phenomenon is happening to other linking in the same sense. It is suspecting that there are factors outside 16 LOSMS elements waiting for us, not to be discovered.

With the SMX Model (Diagram 6), a stratified structured model, as evidence, safety performance is directly influencing the accident rate level. Company support (Co_support) should have interpreted in the way directly relating to three components [Safety Organization (OrgC), Employee Satisfaction on Safety (Ec_Sat), Process Control (ProcessC)] of second level. In the other words, Organization performance needs to have company support and employee involvement. They are interacting within the SMX Model. And, OPTIA factors are critical to affect the safety performance if we percept in pragmatic manner. However, there is not an assessed countries that possess full OPTIA factors within their own LOSMS. Hong Kong Safety Management Regulation is lacking Process Control Factor.

Finally, accident rate level is not influenced by both contract sum and manpower.

Limitation and Recommendations for Future Research

This study is exploratory and as such, embeds the boundary that limited the elements within the legislative system on safety aspects. There may be other elements outside the legislative framework waiting. The next step should involve the discovery of those elements beyond OPTIA factors; the LOSMS elements are not contented. Or, researches of how to formulate instruments, an effective formula of how to calculate safety performance. The findings from this study suggest the importance of both OPTIA factors and SMX model correlate to accident level. The primary strength of this study has given direction of where the safety system should go. The limitation of the study is the professional population is all come from Hong Kong. The discovery result may not apply to other countries of industrial and demographical difference. So, the same study is worth to conduct in other countries by using the same method. The study itself just provide the exploratory of hardware but not a trace of how the software, such as safety culture, influencing the organizational performance. Further research is essential to explore if the hardware can devise the genesis of safety culture or safety climate. Or, the safety management system itself inherited close system nature.

There is another limitation of the research is incapable to get more information in all round, such as speed of construction influencing accident rate, on the responses. Further research can conducted with usage of qualitative data based on structured interviews and focus group if possible will be interesting.

Appendix 1-Pilot Test

Initial Interview of the Safety Professional

Pilot Test