Proposal - KOLF

Wiring Harness & Sub Harness Engine Integration Proposal

Wiring Harness & Sub Harness Engine Integration Proposal

< Current Spec>

① Male and Female Coupler Available in Harness & Sub Harness Eng

K0P/K0L STD – 4P Delete
K0L DLX – 6P→2P

② ACG Sensor Coupler (Harness Wire & ACG) Supplier : Sumitomo

Male Coupler : 32617 MCA A710 Y1

Female Coupler : 32618 MCA A710 Y1

< Proposed Spec>

① Coupler Elimination (Male & Female) ▶ No Coupler (Std)

2P Coupler (Dlx,Std2)

② ACG Sensor Coupler Supplier Change Sumitomo → Yazaki ▶ Male Coupler :91771 K0J N010 Y1

Female Coupler:91772 KWP H010 Y1

Model Wise CR

Model	RS / Veh	Imp Month	Mil Rs.
K0P	-34.30	Dec' 21	-19.01
K0L	-41.97 (Std) -32.53 (Dlx)	Oct' 21	-6.13
K1J	-35.20 (Std/Dlx)	Oct' 21	-1.39
K0Y	37.74 (Std) -25.73 (Dlx	Nov' 21	-4.96

< Proposal Logic >

Background

- Base model used separate eng sub harness for ease of assy.
- Harness Wire and Sub Harness Eng come from Same Supplier in all Models so this idea can be implemented at Harness Supplier End.
- ACG Sensor Coupler is commonization with Yazaki coupler (K0NA common part) for Cost Merit.

Model	Maker Harness	Maker ACG
K0P (CRF Approved)	Minda , Dhoot	Denso
K0L	Msumi	Mitsuba
K1J	Msumi	Mitsuba
K0Y	Msumi, Minda	Mitsuba

< SEDB Judgment & Testing Status >

Team	Judgement	Comment
Sales	O	OK, Non-Visible area
HRID	O	OK (Testing Completed K0LF)
QC HO	O	OK (Testing Completed K0LF)
MFG	O	OK (Trial Result OK)
PU	O	OK
Cert	O	OK (EMI/EMC Test Result OK)
CS	O	K0L (Only New model change Implement)

- ❑ Reporting done for above change in K0P,K0L,K0Y,K1J to CPO/CQO san
- ❑ Phase 1 -> K0PG WVTA CRF Approved
- ❑ Phase 2 → Request for K0LF WVTA Approval , Detail explanation in further slide

K0LF Change point explanation Summary

Change Point	Part Name	Change Details	Application				Validation						Remarks K0P Vs K0L
			K0PG		K0LF		EQ	AF			Cert.	HRID	
			STD	DLX	STD	DLX		2F	3F	4F			
1a	Harness Wire & Sub Harness Eng.	Merging of Sub Harness, Eng. with Main Wire Harness	O	O	O	X	O	O	O	O	O	O	Common with K0PG Proposal, Already CRF approved
1b		6P → 2P coupler (for Speed sensor circuit)	X	X	X	O	O	O	O	O	O	O	Explained in slide 4 (Inform to CQO in K0P CRF approval)
2	Harness Wire	Change of Ignition coil terminal Cover from Black to Transparent	O	O	O	O	O	O	O	O	O	O	Common with K0PG Proposal, Already CRF approved
3	Harness wise & ACG – Stator Comp	Sensor Module Coupler Change from Sumitomo → Yazaki	O	O	O	O	O	O	O	O	O	O	Common with K0PG Proposal, Already CRF approved
4	Harness Wire	Waterproof Joint Change : Water pad → Heat shrink tube	O	O	O	O	O	NA	NA	NA	O	O	Already Implemented from K0PA

- ❑ In K0LF all Design , Quality & Assembly confirmations have been done similar to K0P -> OK
- ❑ In K0LF DLX, Coupler change from 6P → 2P Due to speed sensor is assembled in AE.
- ❑ K0P Heat Shrink tube is Horizontal deployment in K0L also(Water Pad deletion)

K0LF STD1: Merging of Sub Harness, Eng with Main Wire Harness

Same as K0PG

Coupler Name : WPC 4P 025 F
Part No: 91726 – TY3- 0030-H1

Coupler Name : WPC 4P 025 M
Part No: 91725-TY3-0030-H1

Wire Harness

Sub Harness, Eng.

Ignition Coil

Temp. Sensor

Coupler Name : Clip Coupler
Part No: 91535-STK-0030-H1

Coupler Name : Clip Band Harness
Part No: 91541 – KWP – F210-Y1

No Change in Overall Effective length & Clip Position

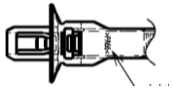
No change

Change : Eliminate Coupler

Wire Harness

Ignition Coil

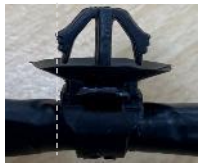
Temp. Sensor



Coupler Name : Clip Band Harness
Part No: 91542 – SWY – 0031-H1

Coupler Name : Clip Band Harness
Part No: 91541 – KWP – F210-Y1

No change



For K0LF STD1 Variant, Eng Sub harness to be integrated with main harness.

KOLF DLX/STD2 : Optimization of 6P → 2P coupler

Idea 1b

Coupler Name : WPC 6P 025 F
Part No: 91772 - KWP- H010-Y1

Coupler Name : WPC 6P 025 M
Part No: 91771-K0J-N010-Y1

Wire Harness

Sub Harness, Eng.

Ignition Coil

Speed Sensor

Temp. Sensor

Coupler Name : Clip Coupler
Part No: 91535-STK-0030-H1

Coupler Name : Clip Band Harness
Part No: 91541 – KWP – F210-Y1

Change : Optimize Coupler
6P → 2P

No Change in Overall Effective length & Clip Position

Ignition Coil

Wire Harness

Temp. Sensor

Sub Harness, Eng.

Speed Sensor

Coupler Name : WPC 2P 060 F
Part No: 91775-T5A-0030-H1

Coupler Name : WPC 2P 060 M
Part No: 91763-TAA-0030-H1

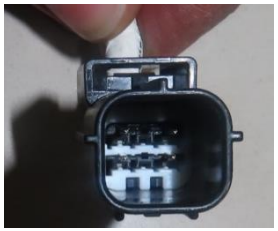
For all Digital meter models, No of circuits in Eng sub harness to be reduced from 6 ->2.
Reason : Speed Sensor has to be assembled in AE

SC models ACG Stator – Sensor Module Coupler maker change

Idea 2

Circuit	Harness wire <-> ACG Sensor Module
Illust	Existing → Proposal

Sumitomo(Import)



Yazaki(Local)

*** Proposed coupler Already use in K1E, K1C, K0N, K0V**

	Sumitomo	Yazaki
Spec	HES D3217	
Insertion force of Connector	66.7N Max (As per HES)	
Removal Force of Connector	66.7N Max (As per HES)	
Stopper Point	No Change	
Wire Size	No change (AVSS 0.3f)	
Terminal Catch	No change	

Male Coupler	Same as K0PG
32617 MCA A710 Y1 → 91771-K0J-N010-Y1 WPC 6P 025 M → WPC 6P 025 M	

Female Coupler
32618 MCA A710 Y1 → 91772 - KWP- H010-Y1 WPC 6P 025 F→ WPC 6P 025 F

Condition	Harness Side	ACG Sensor Side
Before	Female	Male
After	Male	Female

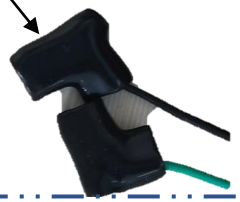
***Change due to accommodate tapping on harness side**

Additional change: Ign coil connector cover color Black -> Transparent

Idea 3

As per request from AF :
Due to the change in process, the visibility of Ignition coil coupler connection has become difficult.
Request is to change the boot colour of coupler to transparent for better **Quality control and confirmation.**

Black -> Transparent



ACG sensor connector to be changed from Sumitomo to Yazaki (Common parts use)

K0LF Change point explanation Summary

Change Point	Part Name	Change Details	Application				Validation						Remarks K0P Vs K0L
			K0PG		K0LF		EQ	AF			Cert.	HRID	
			STD	DLX	STD	DLX		2F	3F	4F			
1a	Harness Wire & Sub Harness Eng.	Merging of Sub Harness, Eng. with Main Wire Harness	O	O	O	X	O	O	O	O	O	O	Common with K0PG Proposal, Already CRF approved
1b		6P → 2P coupler (for Speed sensor circuit)	X	X	X	O	O	O	O	O	O	O	Explained in slide 4 (Inform to CQO in K0P CRF approval)
2	Harness Wire	Change of Ignition coil terminal Cover from Black to Transparent	O	O	O	O	O	O	O	O	O	O	Common with K0PG Proposal, Already CRF approved
3	Harness wise & ACG – Stator Comp	Sensor Module Coupler Change from Sumitomo → Yazaki	O	O	O	O	O	O	O	O	O	O	Common with K0PG Proposal, Already CRF approved
4	Harness Wire	Waterproof Joint Change : Water pad → Heat shrink tube	O	O	O	O	O	NA	NA	NA	O	O	Already Implemented from K0PA

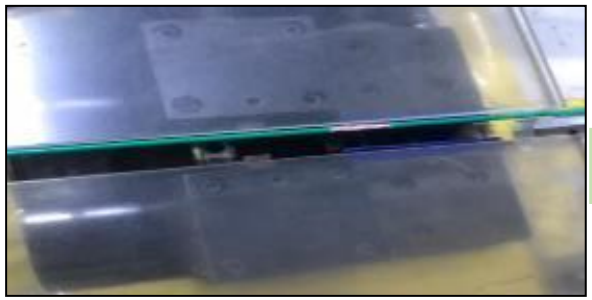
- ❑ In K0LF all Design , Quality & Assembly confirmations have been done similar to K0P -> OK
- ❑ In K0LF DLX, Coupler change from 6P → 2P Due to speed sensor is assembled in AE.
- ❑ K0P Heat Shrink tube is Horizontal deployment in K0L also(Water Pad deletion)

Waterproof Joint Sealing Process Change : Water pad to Heat shrink tube

Idea 4

Waterproof Joint Process: No Change

1. Wire cutting & stripping.



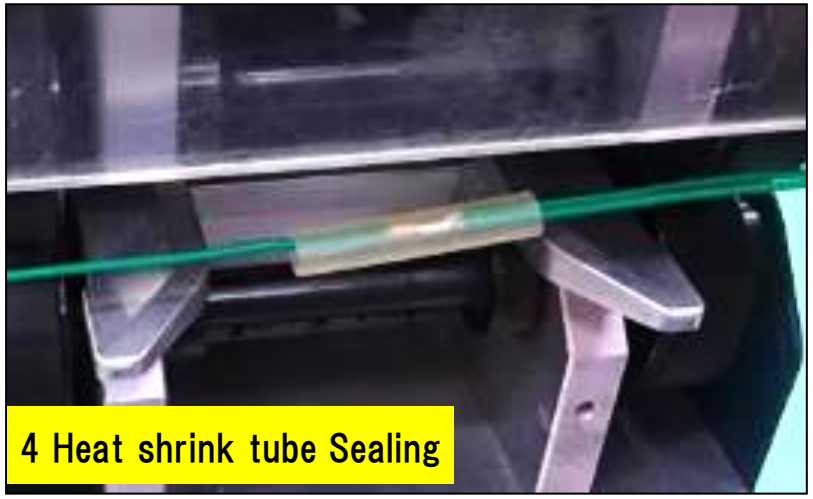
2. Middle Splicing.

3.Joint Crimping

Waterproof Sealing Process: Change in Sealing (Same as K0P)

Existing

Proposal



- Heat Shrink tube is already being used in Dhoot & Minda Sai Harness maker(K0P,K0Y)
- Msumi is already using in K0NF Model
- Now proposal for horizontal Deployment in K0LF

Waterproof joint to be change from Water pad to Heat shrink tube

Denso test Results for K0LF Engine Sub Harness elimination CR Idea

Category	Test Items	Criteria	Results	Judgement
Wiring	Wiring and parts L/O	Must be satisfied in check list of A024-1-1-1	Found OK as per A024-1-1-1	OK
Ignition	Demand & Supply spark performance	Supply voltage must exceed demand voltage	Min. Voltage gap is 4.6KV at 3000 r/min (Snap)	OK
Radio Noise	Broadband Noise (Based on UN/ECE R10-03)	The noise for the CBU must be no higher than the test evaluation values	Minimum margin observed was STD: Peak 8.5dB / 857.6MHz DLX: Peak 5.65dB / 841.15MHz	OK
	Narrowband Noise (Based on UN/ECE R10-03)	The noise for the CBU must be no higher than the test evaluation values	Minimum margin observed was STD: Average 1.31dB / 70MHz DLX: Average 4.42dB / 55.65MHz	OK
Environmental Compatibility	Water ingress test	When vehicle is high pressure water washed. No engine problem, malfunction is allowed.	No electrical malfunction observed.No water entry inside electrical parts observed.	OK
	Pool riding	No engine stop or malfunction is allowed	No water ingress and no electrical malfunction observed.	OK
	Vehicle wash with hose	No engine stop or malfunction is allowed	No water ingress and no electrical malfunction observed.	OK
	Thermocycle respiration test for harness	Water ingress is not allowed to the parts designed to be water proof due to thermocycle respiration	No water ingress observed	OK
	UN/ECE R10-03	No electrical malfunction is allowed.	No malfunction observed.	OK
	Mobile phone substitution test	No electrical malfunction is allowed.	No malfunction observed.	OK
	Ignition noise	There must be no malfunctions.	No malfunction observed.	OK
	Each electrical load noise	There must be no malfunctions.	No malfunction observed.	OK

- DR test completed in both STD1 & DLX Variants

All tests confirmed for K0LF model and found OK.

AF Confirmation for STD/DIX Models for all factories (2F/3F/4F)

Cycle Time Study		Case ① - Mechanical Meter [K0P, K0Y Std1, K0L Std1]		Case ② - Digital Meter [K0L Std2 & Dlx, K0Y Dlx, K1J]	
Area		AE2F	AF2F	AE2F	AF2F
Change Points [Process time]		Sub Harness Eng. Deleted	New Wire Harness [Old Harness + Sub Harness Eng. – 2 Couplers]	Sub Harness Engine [Ignition & Temp. Sensor Branch Eliminated]	New Wire Harness [Old Harness + Ignition & Temp. Sensor Branch]
Process Feasibility		Yes	Yes	Yes	Yes
Cycle time (secs)	Before	10 [Assy - 7, Part Load - 3]	-	7	-
	After	0	47	0	47
	Impact	-10	+47	-7	+47
Cost Impact [Rs/Veh] [Manpower Cost/Sec @0.05]		-0.5	+2.35	-0.35	+2.35
		+1.85		+2.0	

Request Point	Action Taken	Status
Request 1:- Addition of 2MP/Shift/Line to compensate the increase in CT due to process Increase .	Cost considered in CR based on Manpower request by AF	◯
Request 2:-Change of Boot Colour of Ignition Coil from Black → Transparent	Proposal discussed and agreed by HRID to implement in Drawing	◯

Feasibility is confirmed from 2F/3F/4F & both the request are considered to Apply this Proposal.

CQO San Comment during K0PG CRF :

- Trial event to be done in all factories(In Consensus Plant head)

Trial Done & Explanation Done to CQO san for K0PG, CRF Approved

Same activity has been done in K0LF, explanation in next slides

AF Confirmation of Online Trial Event

- Proposal was discussed for conducting Trials in each factory
- Consensus done with each factory
  - 2F : Miyagawa San ,Plant Head
  - 3F : Yamamoto San ,Plant Head
  - 4F : Plant Head
- Date fixed for Offline & Online Training/Trial in each factory.

Control Item	Items	2F	3F	4F
K0L	Vehicle Availability	1	3	3
CR Proposal	Proposal explanation to AF Team	22nd July	22nd July	22nd July
	Proposal Explanation to OH (Along with K0P)	24 July	24 July	24 July
Document	Process Plan	16th Aug	16th Aug	16th Aug
	PQCS			
	WPC Check Sheet			
	OPS			
	Training Record			
Training	Off Line	16th Aug	16th Aug	16th Aug
	On Line			
Online Trial	As per WPC Check Sheet	18th Aug	18th Aug	17th Aug
	As per OPS Verification			
	Cycle Time			
	Process Confirmation			

Trial conducted as per above Dates

KOLF Trial Status 2F/3F/4F

Parameter	Criteria	2F Status	3F Status	4F Status	Status
Documents	Process Plan Change	Done	Done	Done	○
	PQCS	Done	Done	Done	○
	WPC Check Sheet	Done	Done	Done	○
	OPS	Done	Done	Done	○
Handling of New Wire Harness	Sub assy → Any concern	No Concern Checked on Line	No Concern Checked on Line	No Concern Checked on Line	○
	Main Line → Any Concern				
Training	Training Manpower → 4 Nos	Training Done → 4Nos	Training Done → 4Nos	Training Done → 4Nos	○
	Training skill Requirement for MP start → L2	Training Skill Achieved → L2	Training Skill Achieved → L2	Training Skill Achieved → L2	○
	Training Skill Matrix	Done	Done	Done	○

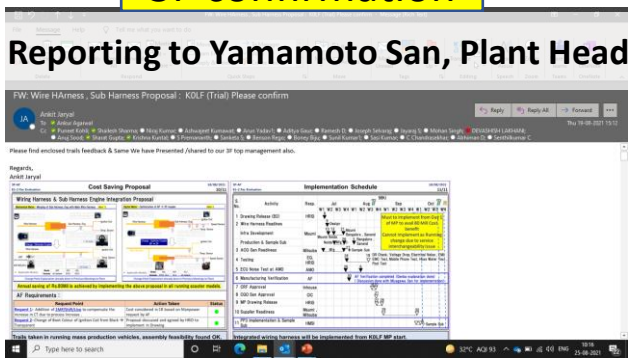
2F confirmation

MOM with Miyagawa San & Takita San Cc Plant Team

		Target Date	Miyagawa san - AF
1	Online Trial of KOLF Vehicle - Assembly	18th Aug	Takita San - CIC
2	Observation from Miyagawa san --> More training required at Temperature Oil sensor connection(KOLF 3D layout to be shared to AF)	18th Aug	Sunil San - AF2F
3	Document & Activities		Rahul San - AF2F
	Process Plan Change	TBD by 19th	Sharat Gupta - CIC
	PQCS	TBD by 19th	
	OPS	TBD by 19th	
	WPC Check sheet	TBD by 19th	
	Operator Training & Skill up	TBD by 19th	
	Training Skill Matrix Final	TBD by 19th	

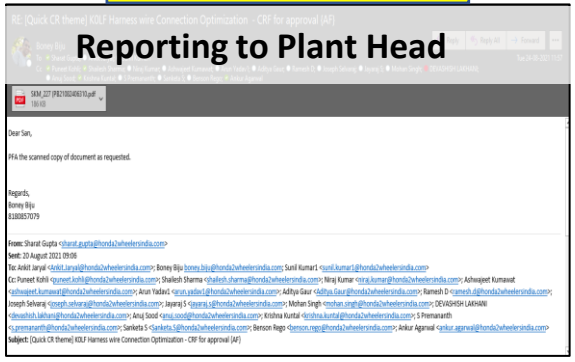
3F confirmation

Reporting to Yamamoto San, Plant Head



4F confirmation

Reporting to Plant Head



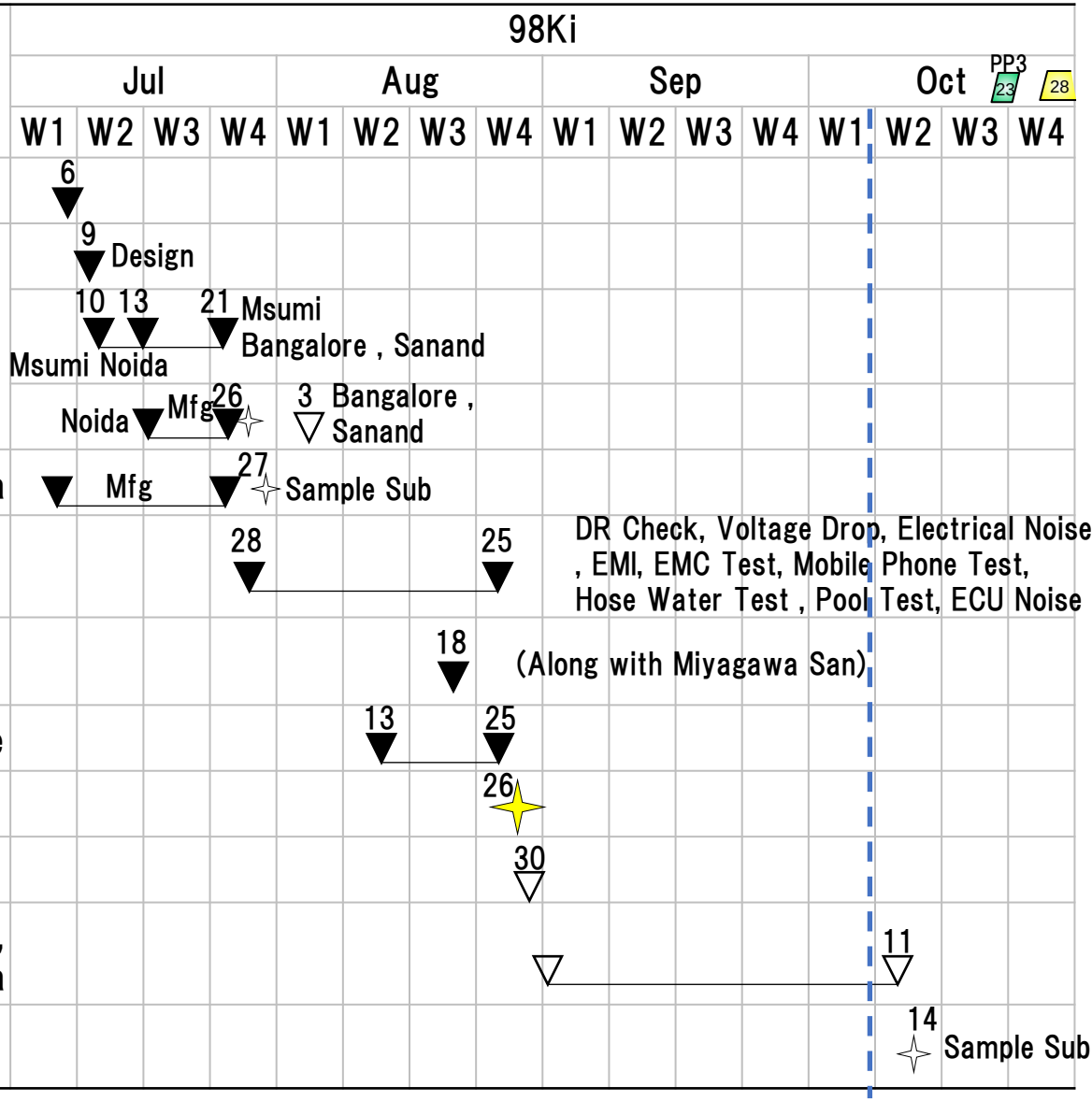
Trial is done and confirmation Received from all factory 2F/3F/4F

Summary of Trials & Reporting done to Factory

Plant	Trial Summary	Resp	Tgt Date
2F	**Miyagawa San : Genba check done during Trial and result is Satisfactory** Comment : More Training required at Temp Oil Sensor Connection	AF	PP3
3F	**Yamamoto San : Genba check done during Trial and result is Satisfactory.** Also Reporting is done to Plant Head during K0LF WVTA E1-2	AF	Done
4F	Trial done and result found satisfactory (Same has been reported to their Plant Head)	AF	Done

❑ KOLF Implementation Schedule

S. No.	Activity	Resp.
1	Drawing Release (B2)	HRID
2	Wire Harness readiness	Msumi
	Infra Development	
	Production & Sample Sub	
3	ACG Gen Readiness	Mitsuba
4	Testing	EQ, HRID
6	Manufacturing Verification	AF
7	CRF Approval	Inhouse
8	CQO/QC OH San Approval	CIC
9	MP Drawing Release	HRID
10	Supplier Readiness	Msumi , Mitsuba
11	PP3 Implementation & Sample Sub	HMSI



Request to CQO/QC OH San for Go Ahead & implementation of Proposal.

Thanks