Statistical Quality Control

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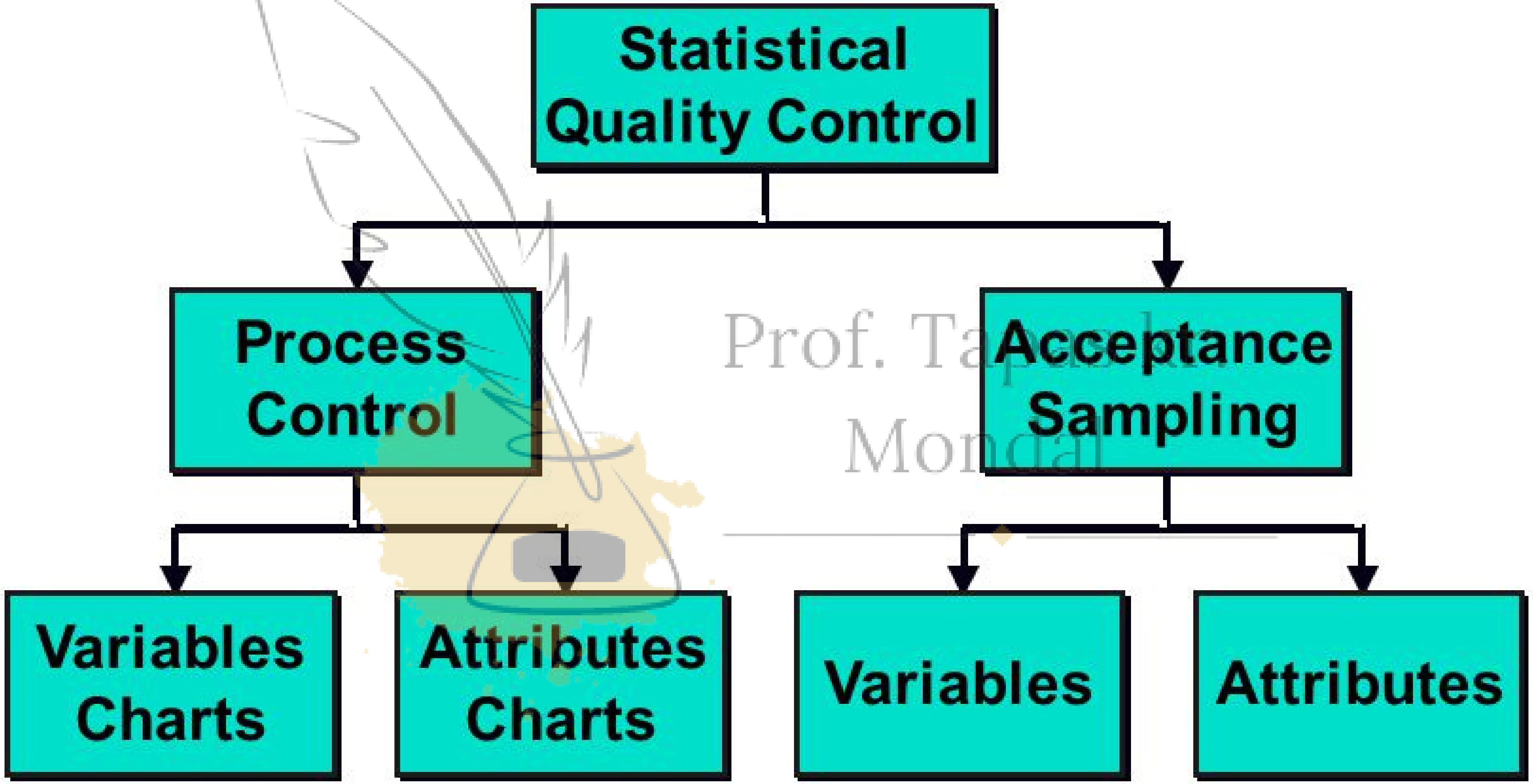
Types of Statistical Quality Control



Statistical Quality Control

Process Control

Acceptance Sampling

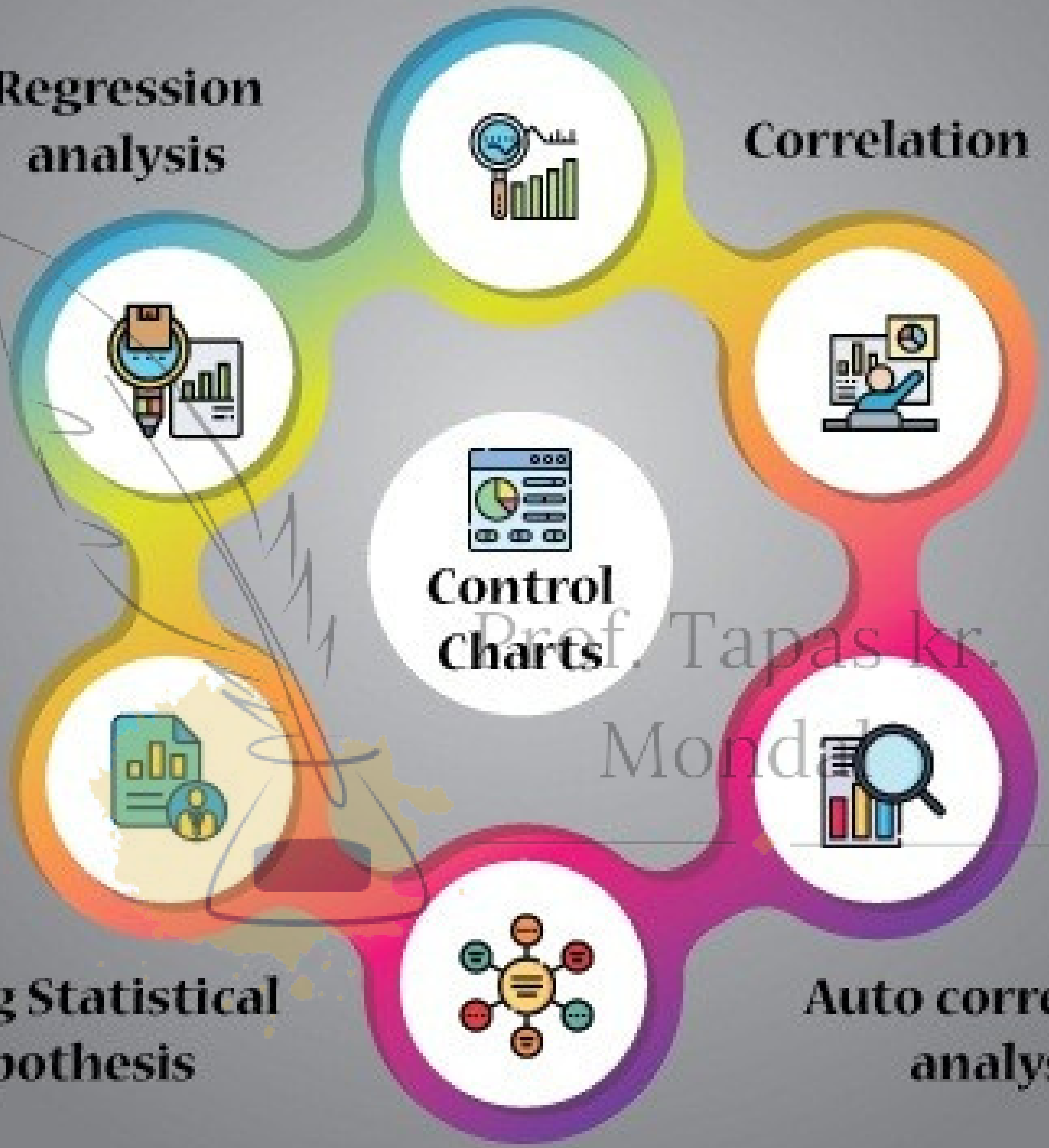
Variables Charts

Attributes Charts

Variables

Attributes

Prof. Tapash Mondal



Trend analysis

Correlation

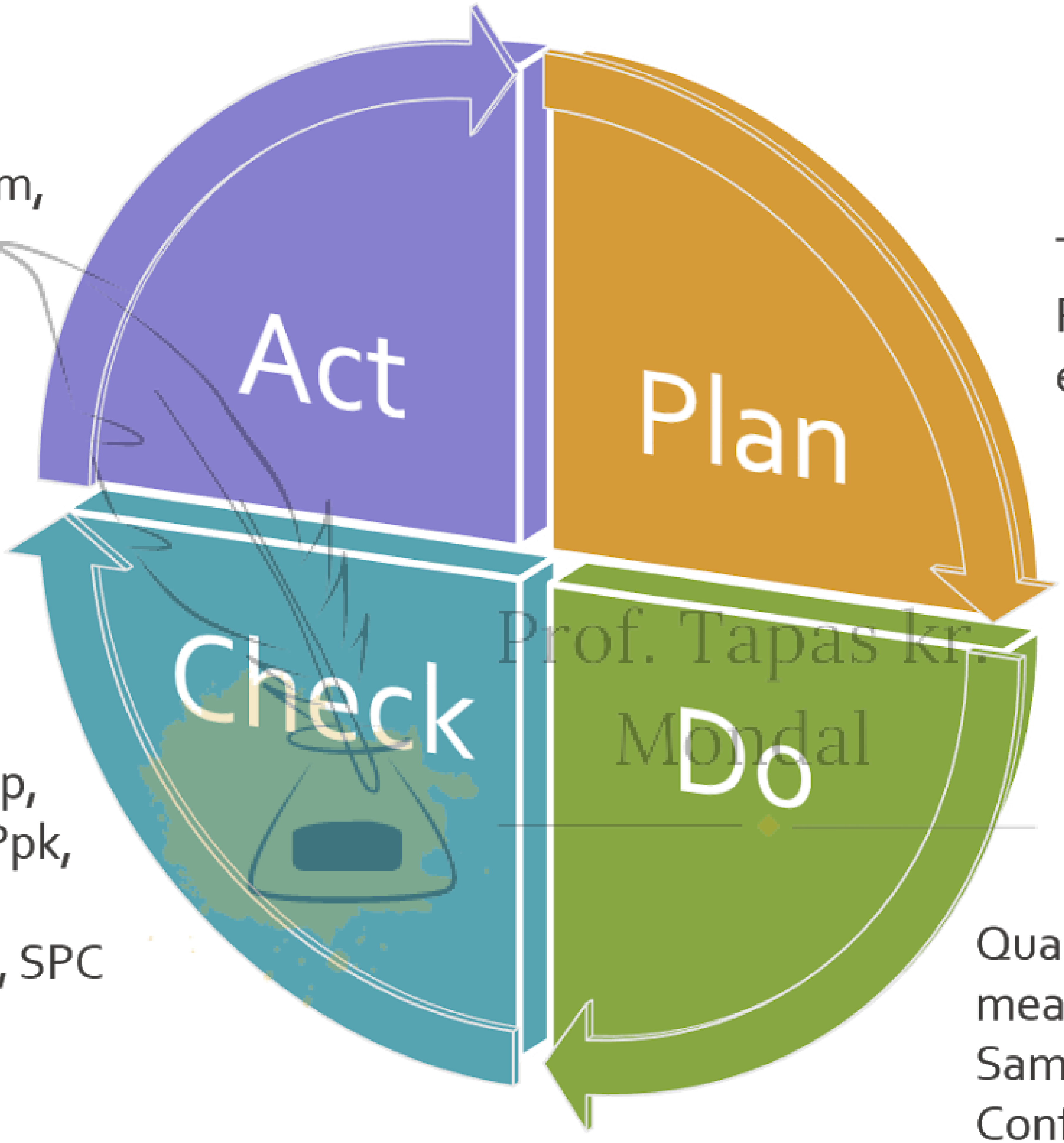
Auto correlation analysis

Statistical Modeling

Testing Statistical Hypothesis

Regression analysis

Control Charts



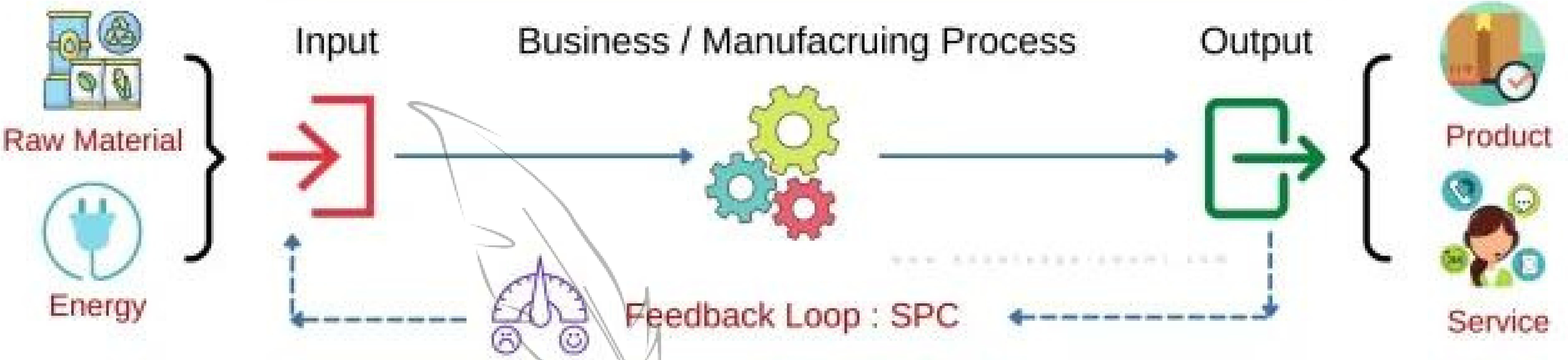
Control chart, Reporting, Alarm, Problem identification

Target, Limit, Product, Measure, etc.

KPI (Average, Cp, Cpk, Cpm, Pp, Ppk, Ppm, Standard Deviation, etc.), SPC Rules

Quality measurement, Sampling, Conformity, etc.

Statistical Process Control (SPC) Overview



Raw Material

Energy

Input

Business / Manufacruing Process

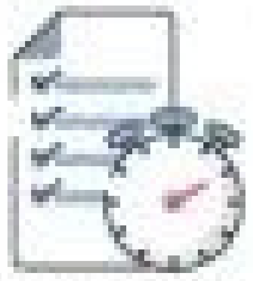
Output

Product

Service

Feedback Loop : SPC

Measurement

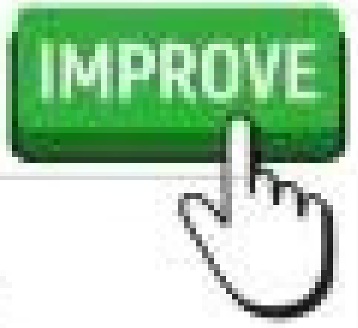


- Raw Material Specification
- Temperature & Humidity
- Machine Parameters
- Product & Service Specification

Analyze

- Histogram / Bar Chart
- Run Chart
- Pie Chart
- Process Capability

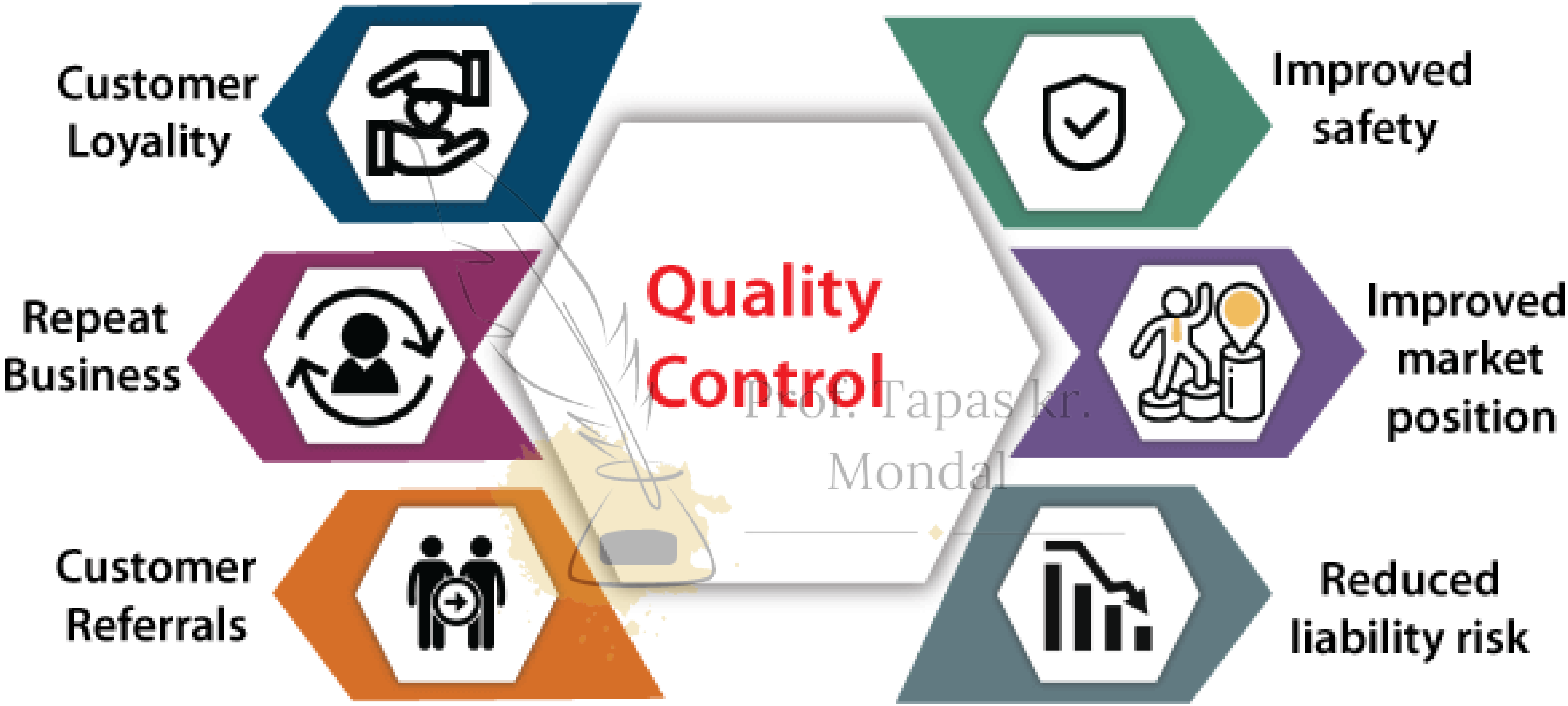
Improve



- Better tools
- Improved process
- Elimination of scrap
- Elimination of defects
- Better customer Satisfaction
- Better efficiency and control

Monitor & Control

- Monitor Process Behavior
- Monitor Product Quality
- Monitor Process Quality
- Control and Sustain



Quality Control

Customer Loyality

Repeat Business

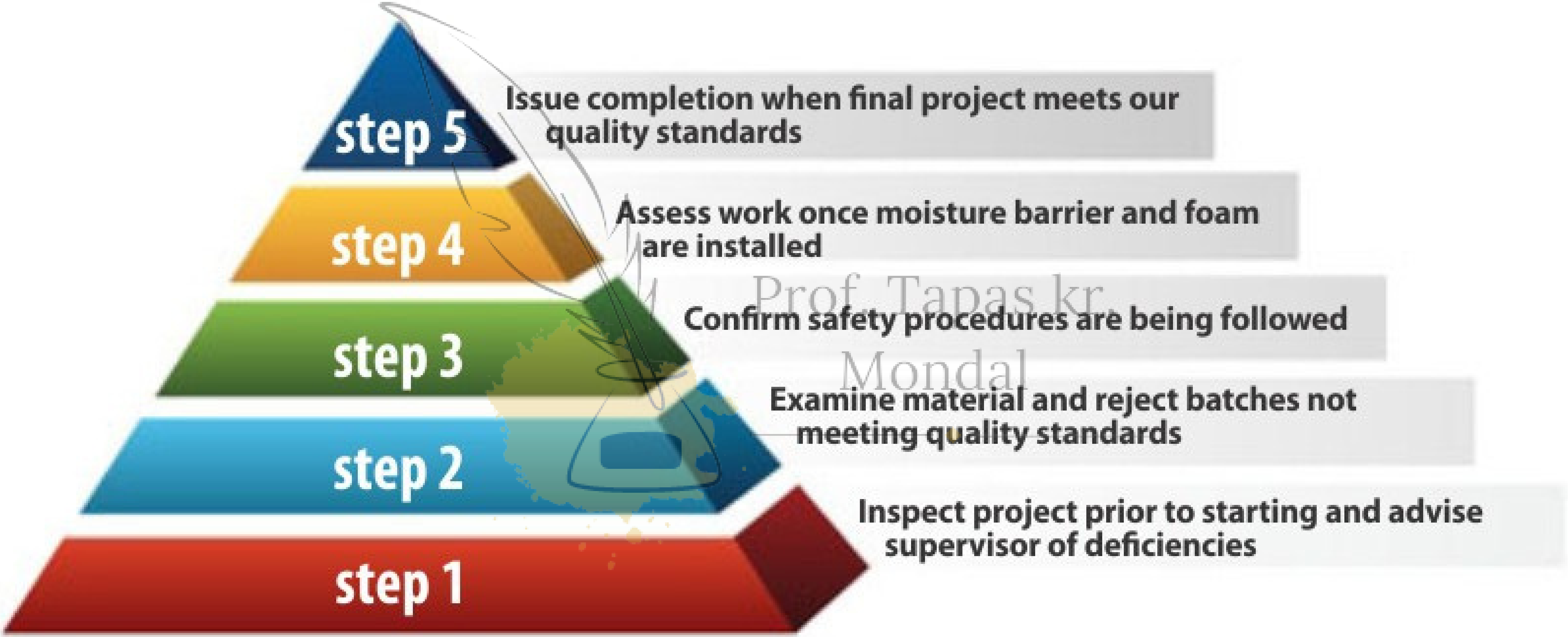
Customer Referrals

Improved safety

Improved market position

Reduced liability risk

5 - POINT QUALITY CONTROL INSPECTION



step 5 Issue completion when final project meets our quality standards

step 4 Assess work once moisture barrier and foam are installed

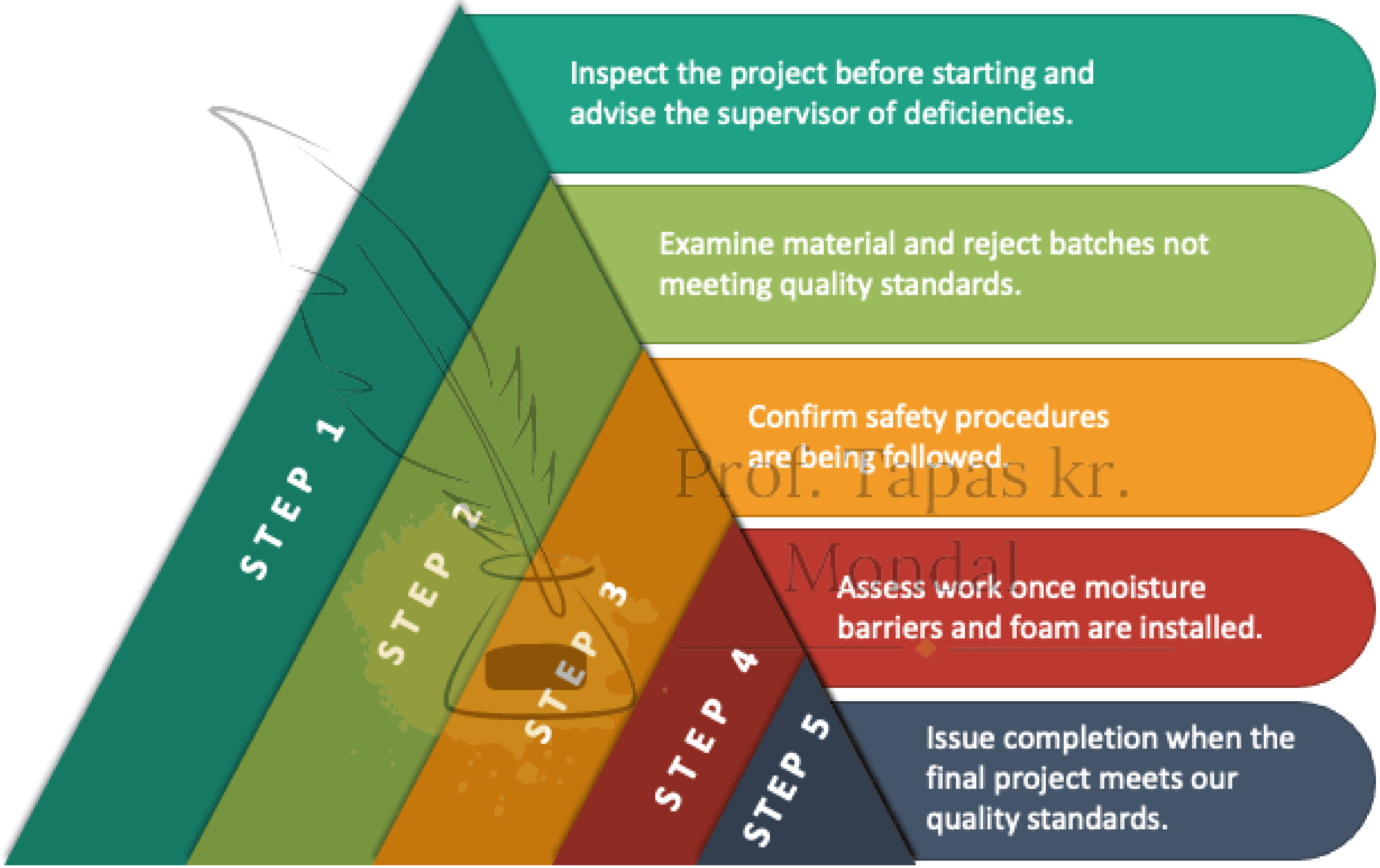
step 3 Confirm safety procedures are being followed

step 2 Examine material and reject batches not meeting quality standards

step 1 Inspect project prior to starting and advise supervisor of deficiencies

QUALITY CONTROL & INSPECTION

5 Point Quality Control Inspection



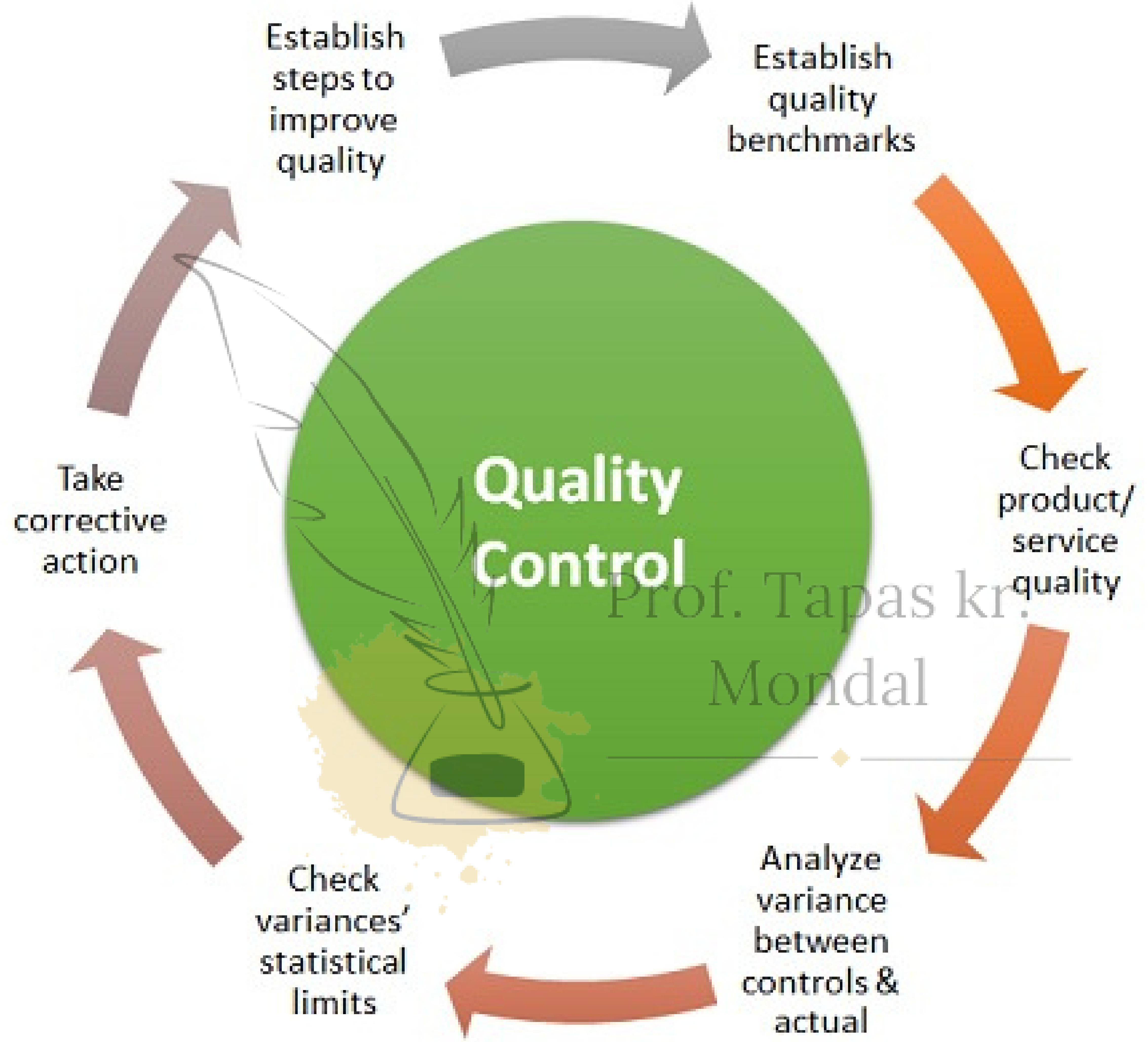
Inspect the project before starting and advise the supervisor of deficiencies.

Examine material and reject batches not meeting quality standards.

Confirm safety procedures are being followed.

Assess work once moisture barriers and foam are installed.

Issue completion when the final project meets our quality standards.



Quality Control

Establish quality benchmarks

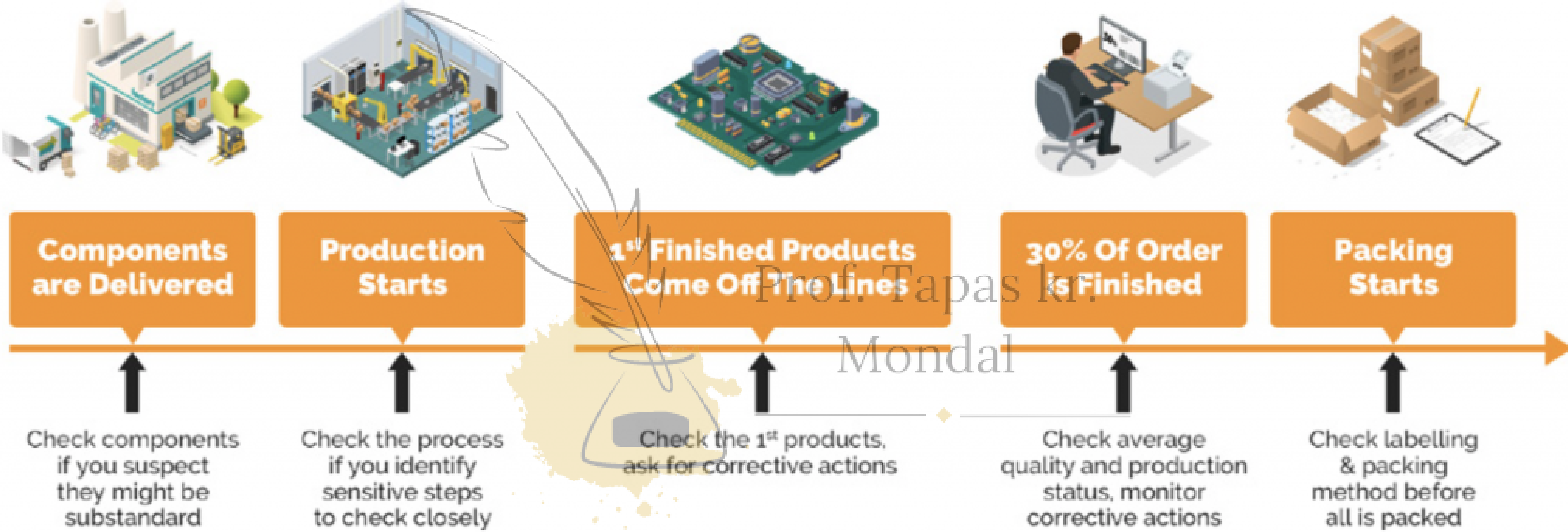
Check product/ service quality

Analyze variance between controls & actual

Check variances' statistical limits

Take corrective action

Establish steps to improve quality



Components are Delivered

Check components if you suspect they might be substandard

Production Starts

Check the process if you identify sensitive steps to check closely

1st Finished Products Come Off The Lines

Check the 1st products, ask for corrective actions

30% Of Order is Finished

Check average quality and production status, monitor corrective actions

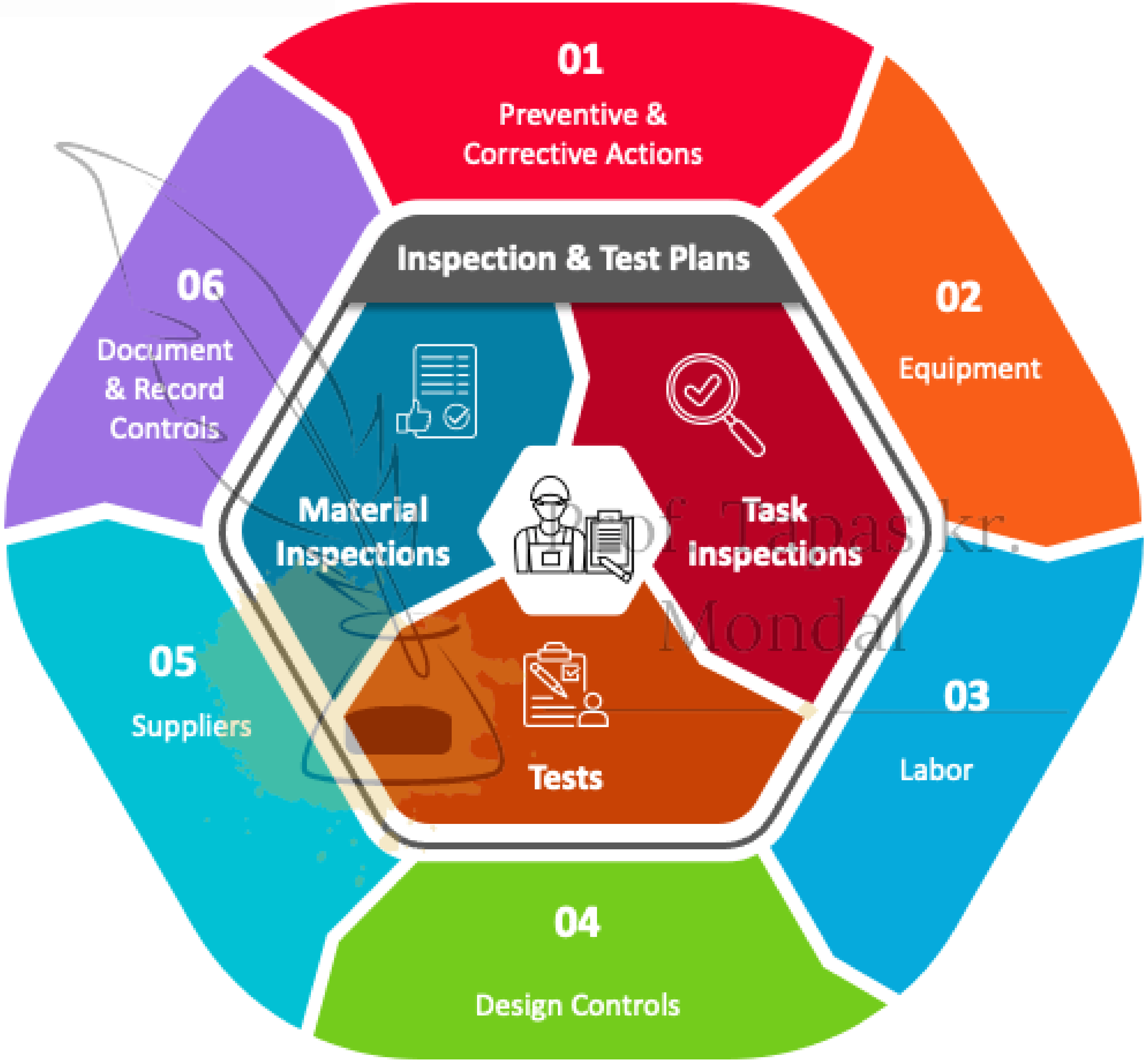
Packing Starts

Check labelling & packing method before all is packed

5 WAYS TO IMPROVE QUALITY CONTROL

1. Build Proper Processes
2. Keep a Clean Workspace
3. Hold Unscheduled Equipment Use Tests
4. Identify Essential Spare Parts
5. Ensure Managers Are Properly Trained

CONSTRUCTION QUALITY CONTROL



01 Preventive & Corrective Actions

02 Equipment

03 Labor

04 Design Controls

05 Suppliers

06 Document & Record Controls

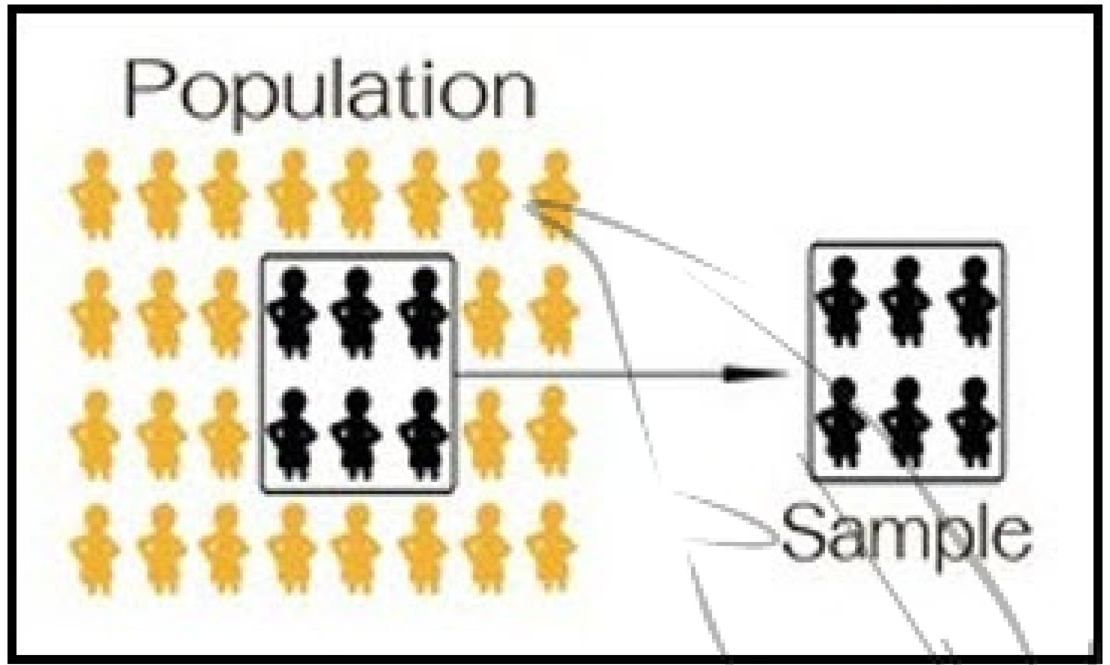
Inspection & Test Plans

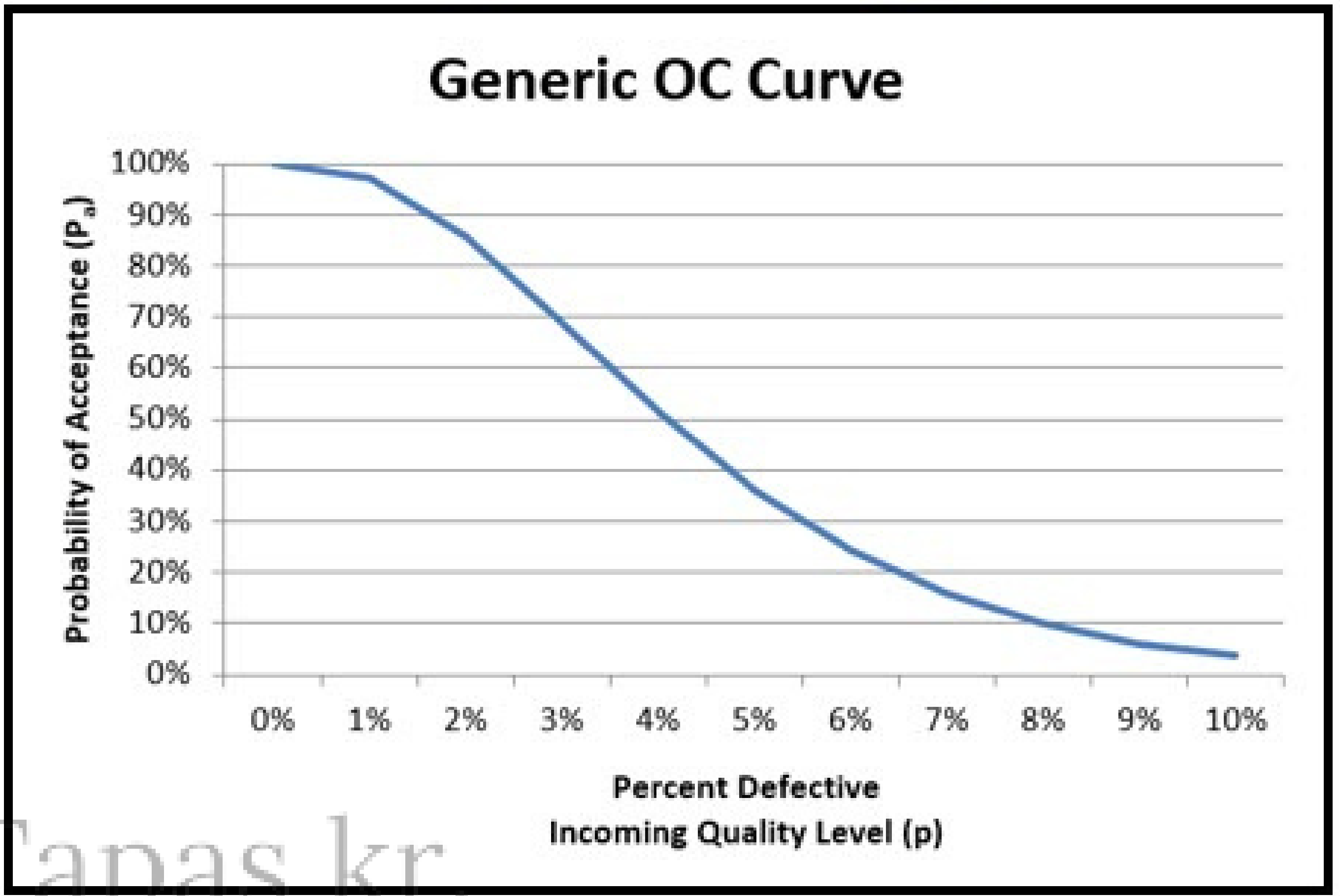
Material Inspections

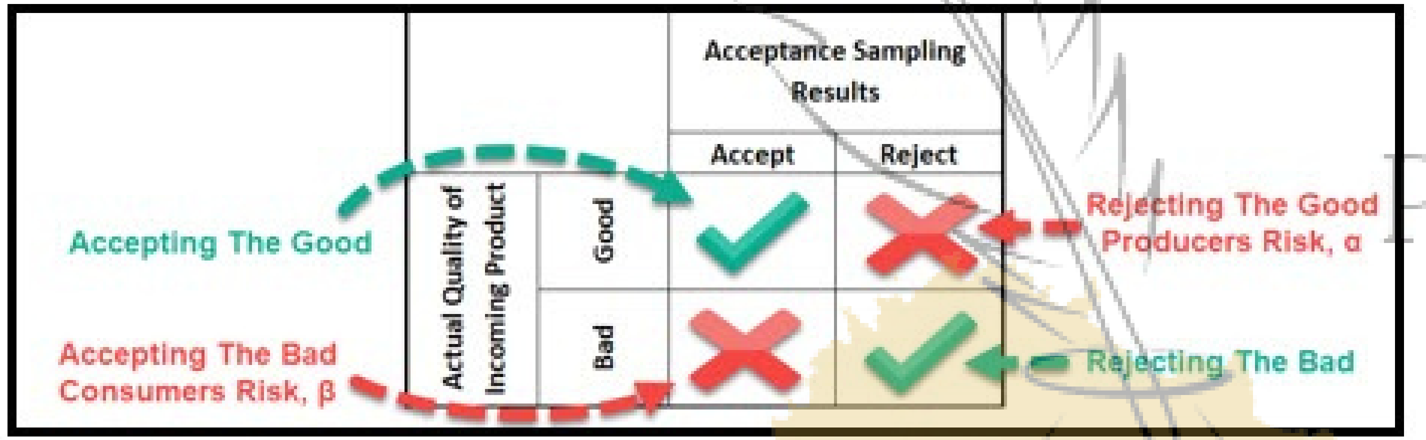
Task Inspections

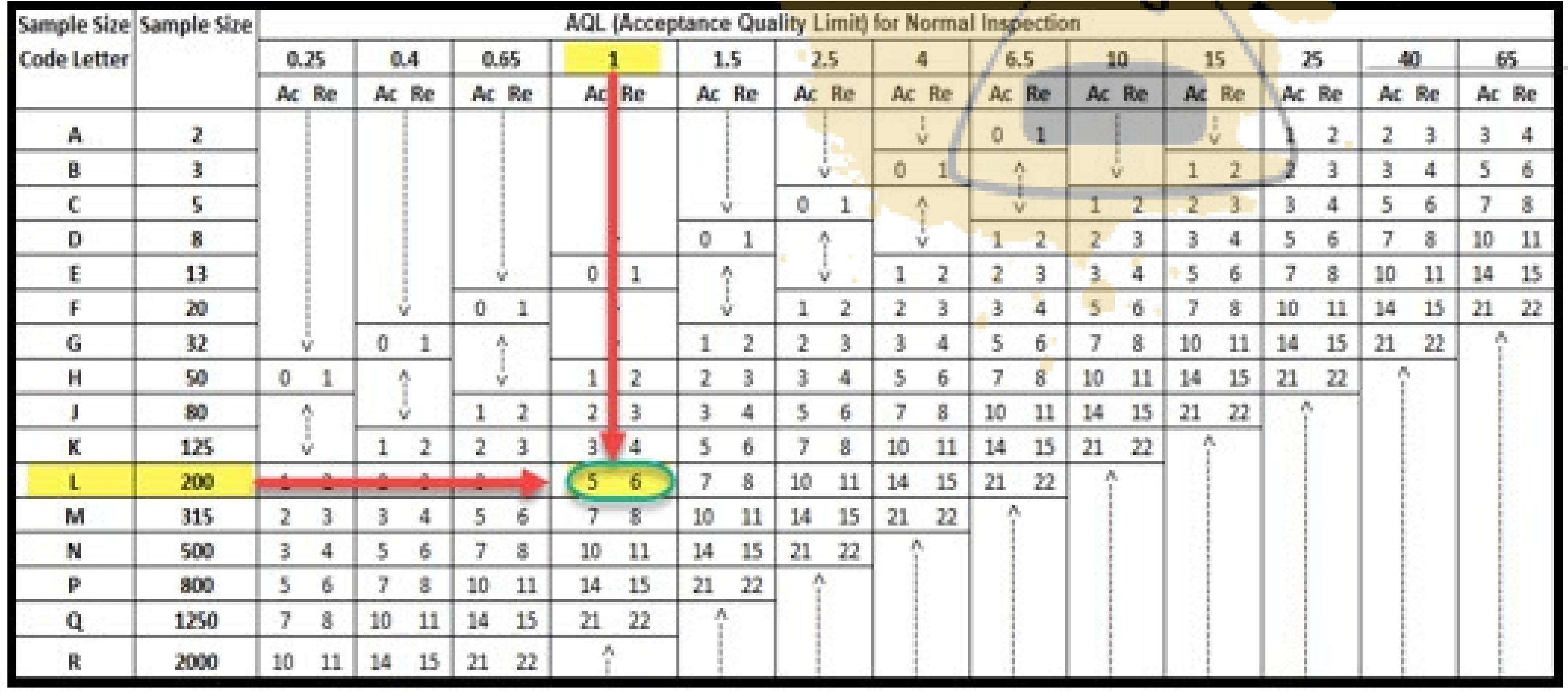
Tests

Acceptance Sampling

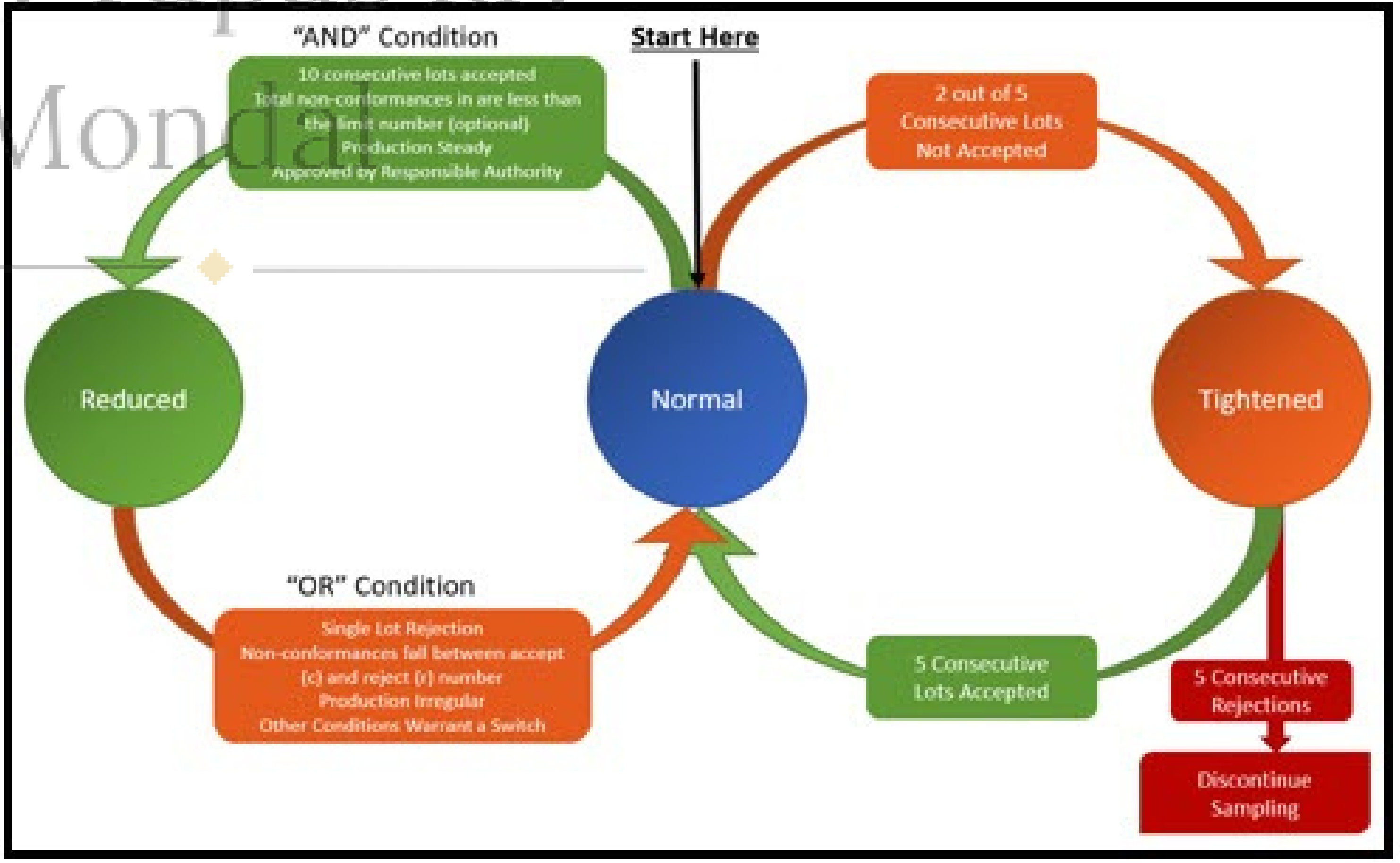

Population
Sample




Acceptance Sampling Results
Accept
Reject
Actual Quality of Incoming Product
Good
Bad
Accepting The Good
Rejecting The Good
Producers Risk, α
Accepting The Bad
Consumers Risk, β
Rejecting The Bad



Sample Size Code Letter	Sample Size	AQL (Acceptance Quality Limit) for Normal Inspection																							
		0.25		0.4		0.65		1		1.5		2.5		4		6.5		10		15		25		40		65	
		Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re	Ac	Re
A	2													v		0	1			v		1	2	2	3	3	4
B	3											v		0	1	^		v		1	2	2	3	3	4	5	6
C	5									v		0	1	^		v		1	2	2	3	3	4	5	6	7	8
D	8									0	1	^		v		1	2	2	3	3	4	5	6	7	8	10	11
E	13					v		0	1	^		v		1	2	2	3	3	4	5	6	7	8	10	11	14	15
F	20			v		0	1			v		1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22
G	32	v		0	1	^				1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22	^	
H	50	0	1	^		v		1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22	^			
J	80	^		v		1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22	^					
K	125	v		1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22	^							
L	200	1	2	2	3	3	[illegible]	5	6	7	8	10	11	14	15	21	22	^									
M	315	2	3	3	4	5	6	7	8	10	11	14	15	21	22	^											
N	500	3	4	5	6	7	8	10	11	14	15	21	22	^													
P	800	5	6	7	8	10	11	14	15	21	22	^															
Q	1250	7	8	10	11	14	15	21	22	^																	
R	2000	10	11	14	15	21	22	^																			


Start Here
Reduced
Normal
Tightened

"AND" Condition

10 consecutive lots accepted
Total non-conformances in are less than the limit number (optional)
Production Steady
Approved by Responsible Authority

2 out of 5 Consecutive Lots Not Accepted

"OR" Condition

Single Lot Rejection
Non-conformances fall between accept (c) and reject (r) number
Production Irregular
Other Conditions Warrant a Switch

5 Consecutive Lots Accepted

5 Consecutive Rejections

Discontinue Sampling

Thank You

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