

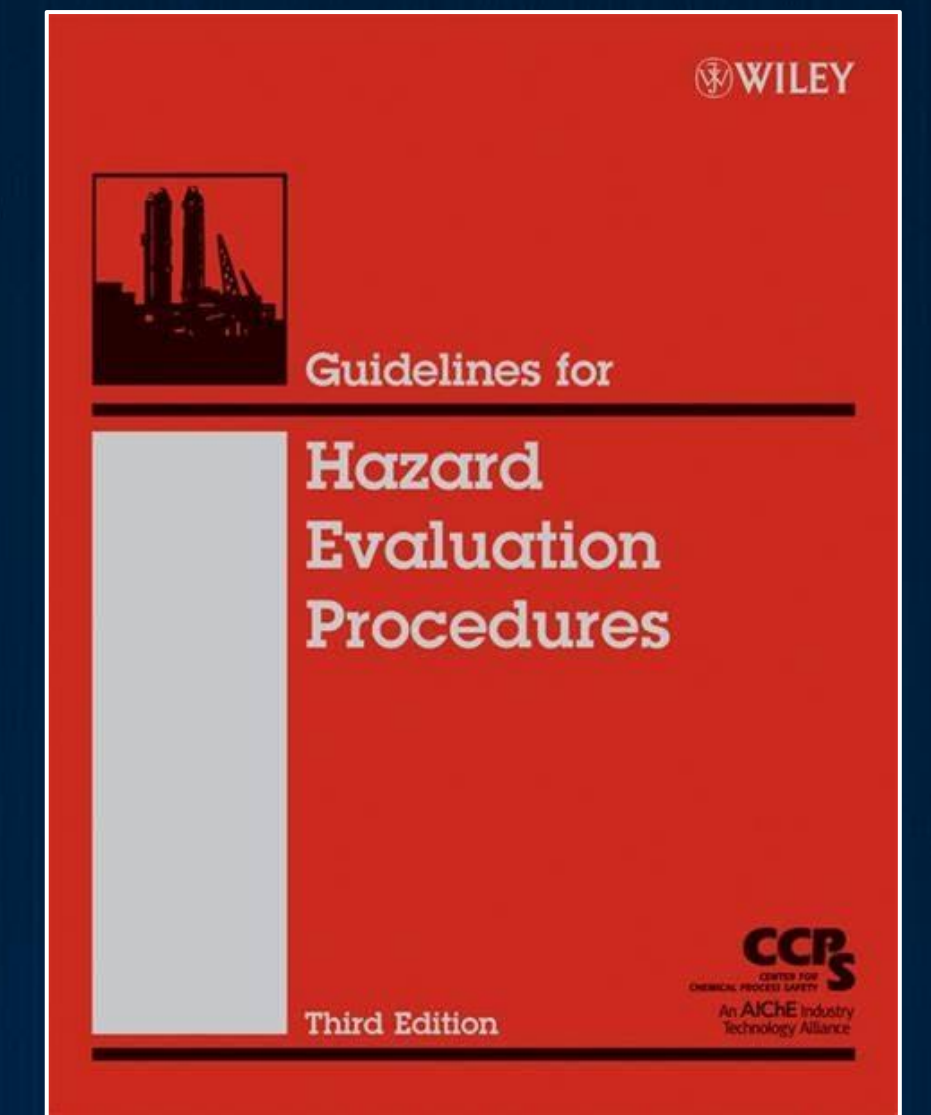
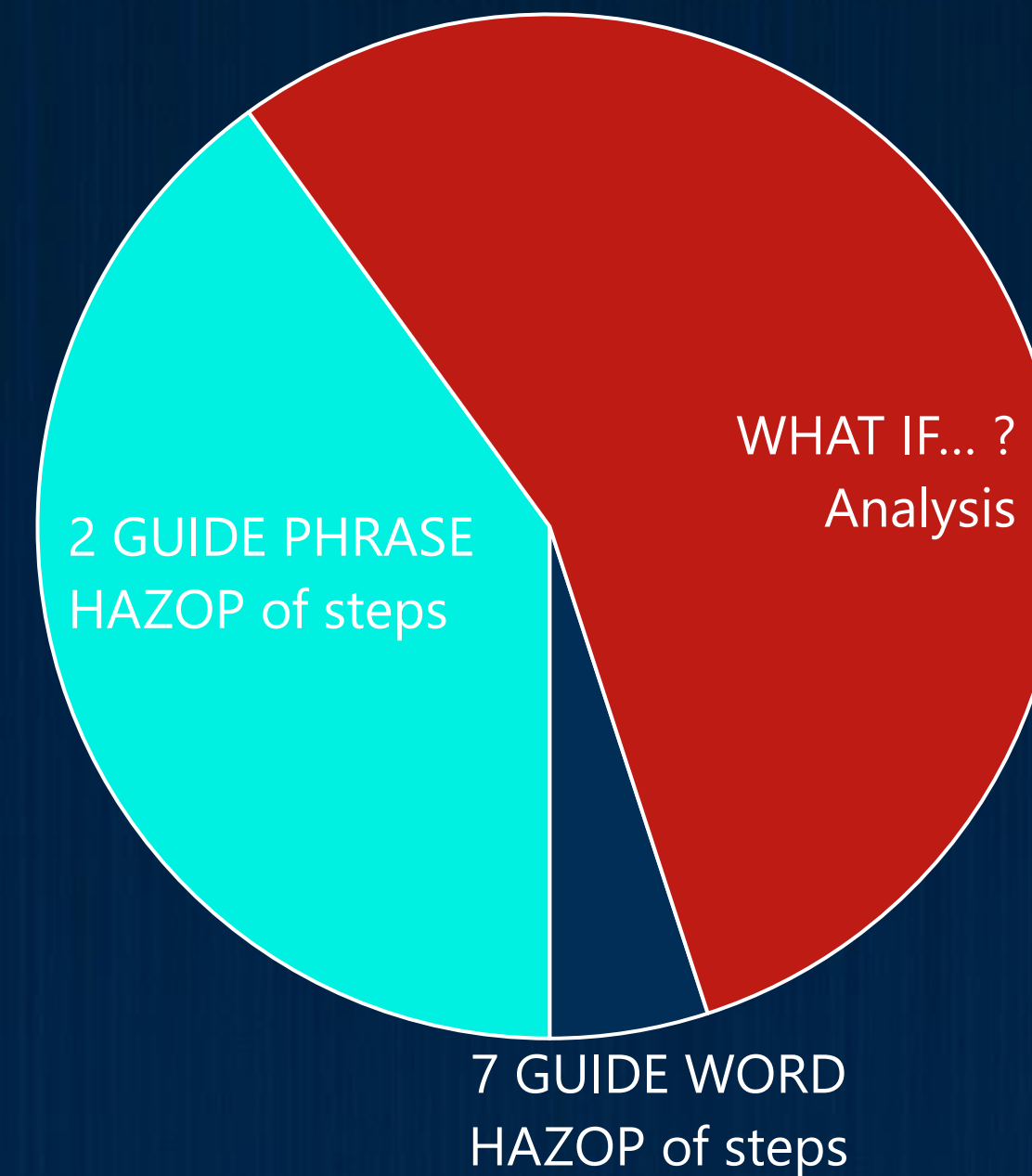
BUSINESS CASE FOR PHA OF STARTUP, SHUTDOWN, AND ONLINE MAINTENANCE PROCEDURES

APPROACH TO PHA OF NON-NORMAL MODES

FIRST: Risk Rank the Procedures

#	SOP	Title	RR
1	BUT900	VAPORIZER (AE-1131/S) PREPARATION FOR MAINTENANCE	H
2	BUT901	COMMISSIONING PROCESS (HYDROCARBON) TO VAPORIZER (AE-1131/S)	M
3	BUT902	PROPANE REFRIGERATION COMPRESSOR MOTOR, AKM-1160 A/B LUBE OIL SYSTEM	L
4	BUT903	PROPANE REFRIGERATION COMPRESSOR, AKM-1160 A/B STARTUP	M
5	BUT904	PROPANE REFRIGERATION COMPRESSOR NORMAL SHUTDOWN	L
6	BUT905	INSTRUMENT AND LOGIC SYSTEM FOR CHILLED WATER	L
7	BUT908	REFRIGERATION COMPRESSOR EMERGENCY PROCEDURE. LOSS OF COOLING WATER / INSTRUMENT AIR AND ELECTRIC POWER	L
8	BUT911	C6 TRANSFER TO DE-ETHANIZER BOTTOM STEAM STRIPPER (AC-0851) / USED WASH OIL DRUM (AV-0841) / FLARE KO DRUM (AV-1161)	L

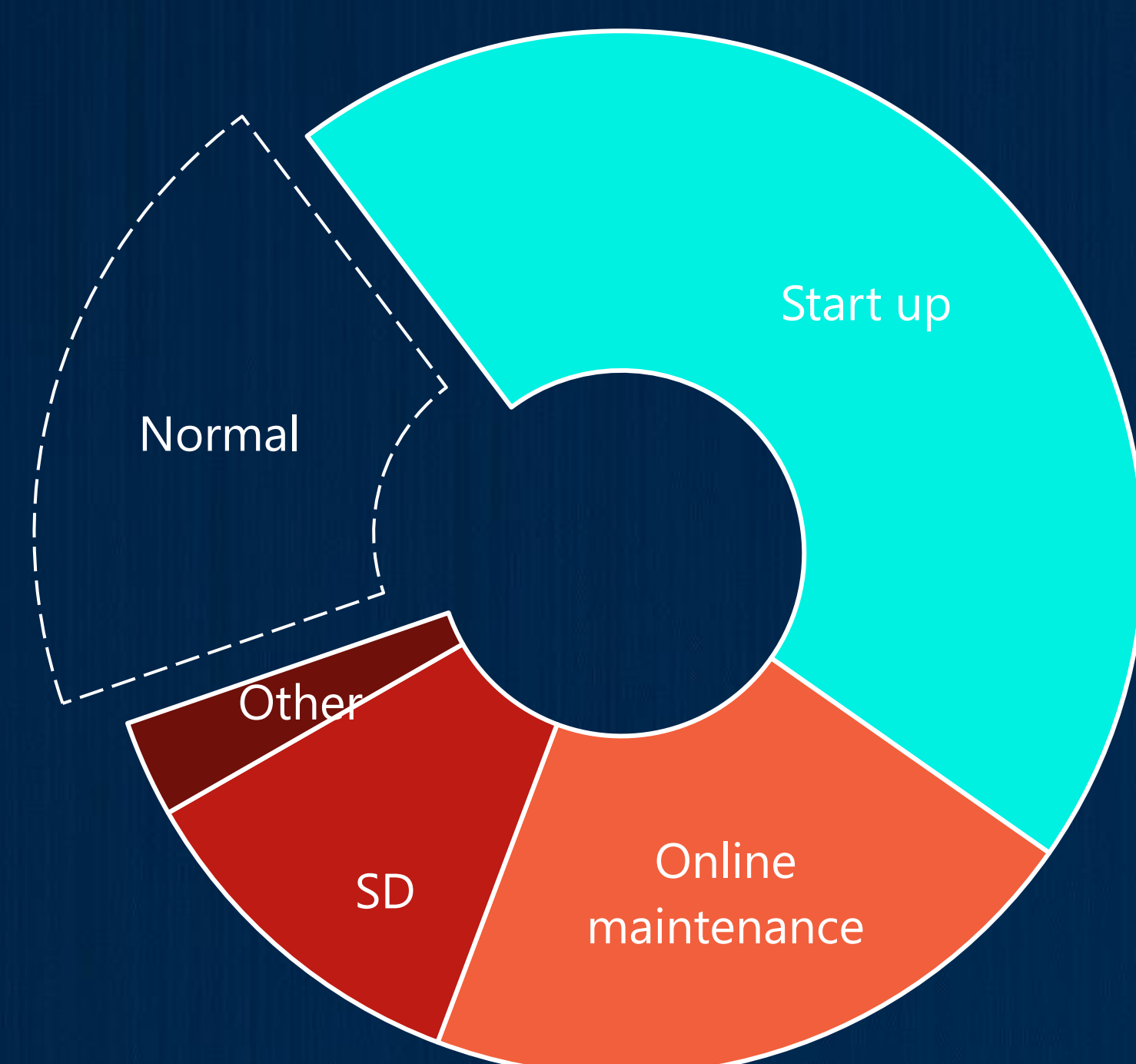
SECOND: Perform PHA of the Procedures



(CHAPTER 09)

LIFE-SAVING REASONS TO CONDUCT PHA OF NON-NORMAL MODES

ACCIDENT DISTRIBUTION by MODE OF OPERATION



+80% of Process Safety Accidents occur during startup, shutdown, and online maintenance

PHA of procedures finds these scenarios

REGULATORY REASONS TO PERFORM PHA OF NON-NORMAL MODES



US OSHA PSM and US EPA RMP require PHA of all modes of operation



Many citations for 30 years on lack of PHA of non-routine modes of operation

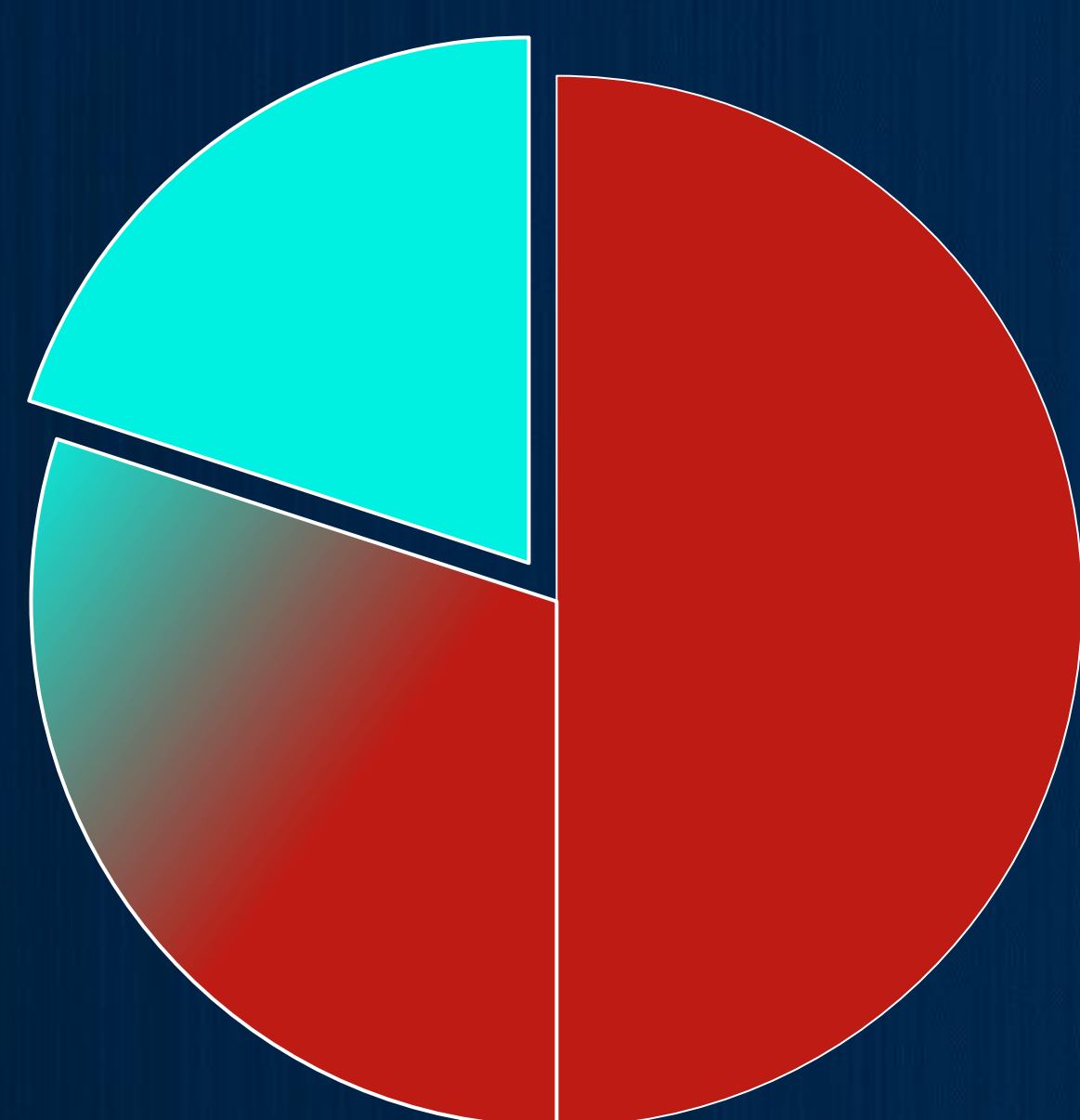


US Regulators are focusing on lack of PHA of Procedures in investigations and emphasis programs



US Chemical Safety Board (CSB) is putting more pressure on regulators

FINANCIAL PAYBACK FROM PHA OF NON-NORMAL MODES



50 to 80% of the Risk Reduction from the entire PHA is from PHA of non-routine modes

\$100,000,000 per week
Average risk reduction per week of meetings for PHA of procedures

1000x ROI
Savings in risk avoidance by implementing the Recommendations from PHA of procedures



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SPRING22
+18th GCPS
A Joint AIChE and CCPS Meeting

PROCESS IMPROVEMENT INSTITUTE
Risk and reliability specialists

