



Development of Innovative & Reliable Models for Crude Oil Qualification

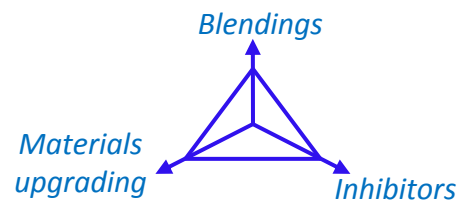
Corrosivity Classification & Effect Prediction

Introduction

Current situation...

- Opportunity crudes growing market
- Use of acid crudes
- NA Corrosion Issues

HOW TO MANAGE IT ?



NEED FOR A DECISION-MAKING AID TOOL

Deterministic Computational Models	vs.	Artificial Neural Networks (ANN)
Unable to compute combined effects of numerous parameters ❌		Fitted to the combined effects computation of numerous parameters ✅

STATEMENT: 'The neural network model can perform extrapolation and interpolation operations for materials selection purposes or to predict corrosion rates as a function of the operating conditions'

Ref. to 'Study of Naphthenic Acid Corrosion by neural network' by UNIMI/ENI, S. P. Trasatti, G. Gabetta, Corrosion Engineering, Science and Technology, 2006

NeuroNAC® JIP

3 influent parameters families Artificial Neural Network Implementation

NeuroNAC® Parameters

Process	Oil	Hydrodynamic																										
<table border="1"> <tr><th>Parameters</th><th>Range</th></tr> <tr><td>Temperature</td><td>[a;z]</td></tr> <tr><td>Mat. Grade</td><td>[a;z]</td></tr> <tr><td>Etc.</td><td></td></tr> <tr><td>% Inhibitor</td><td></td></tr> </table>	Parameters	Range	Temperature	[a;z]	Mat. Grade	[a;z]	Etc.		% Inhibitor		<p>Supplied by Participants:</p> <table border="1"> <tr><th>Parameters</th><th>Range</th></tr> <tr><td>TAN</td><td>[a;z]</td></tr> <tr><td>%S</td><td>[a;z]</td></tr> <tr><td>Etc.</td><td></td></tr> </table> <p>blending</p>	Parameters	Range	TAN	[a;z]	%S	[a;z]	Etc.		<table border="1"> <tr><th>Parameters</th><th>Range</th></tr> <tr><td>Velocity</td><td>[a;z]</td></tr> <tr><td>Reynolds</td><td>[a;z]</td></tr> <tr><td>Etc.</td><td></td></tr> </table>	Parameters	Range	Velocity	[a;z]	Reynolds	[a;z]	Etc.	
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NeuroNAC® -Scale

NeuroNAC® -Ware

Deliverables

- NeuroNAC® JIP Deliverables:**
- **NeuroNAC® -Scale¹:** A qualification tool for crude oils inherent corrosivity
 - **NeuroNAC® -Database²:** A wide shared and compiled database
 - **NeuroNAC® -Ware³:** An innovative, reliable and adaptative NAC Prediction Model

NeuroNAC® JIP Keywords:

- Cost-cutting
- Economics
- Decision-making aid
- Management
- Anticipation