

## Caterpillar C13 Test Criteria

500 hour – Steady State Test Cycle

Test Pass/Fail Criteria:

1. Piston Deposits
2. No Loss of Oil Consumption Control
  - a) Limits to be recommended by Taskforce
  - b) Calculation to be recommended by Taskforce
3. No stuck rings or sluggish rings
4. Other parameters to be determined by Taskforce



## C13 Test Discrimination Criteria Concens

1. **There were significant oil differences and Discrimination for TGC, TLHC and TLC**
2. The current Oil Consumption calculation has had criticism of being marginal ( $p \geq 0.05$ ) and inconsistent, sometimes failing good oils with low deposits and passing poor oils that had high deposits.
3. The correlation between Oil Consumption and Deposits was not high



## C13 Test OC Calculation Improvement

1. The Oil Consumption calculation has been improved to remove the inconsistency of:
  - a) Low initial OC tests that rise but remain low and yet Failed
  - b) High initial OC tests that rise significantly and yet Passed
2. The p value for the 5 or 6 test runs both has  $p \leq 0.05$
3. Correlation between deposits and OC is high/doubled
4. Existing data points are used
5. Shows that Lab H data is valid



## C13 Test OC Calculation Improvement

1. The Improved Oil Consumption calculation only considers Delta of (g/hr data):
  - a) Average value of 450 and 500 hour OC points
  - b) Average value of 100 and 150 hour OC points
  
2.  $\Delta \text{OC} = (\text{Ave}(450, 500)) - (\text{Ave}(100, 150))$

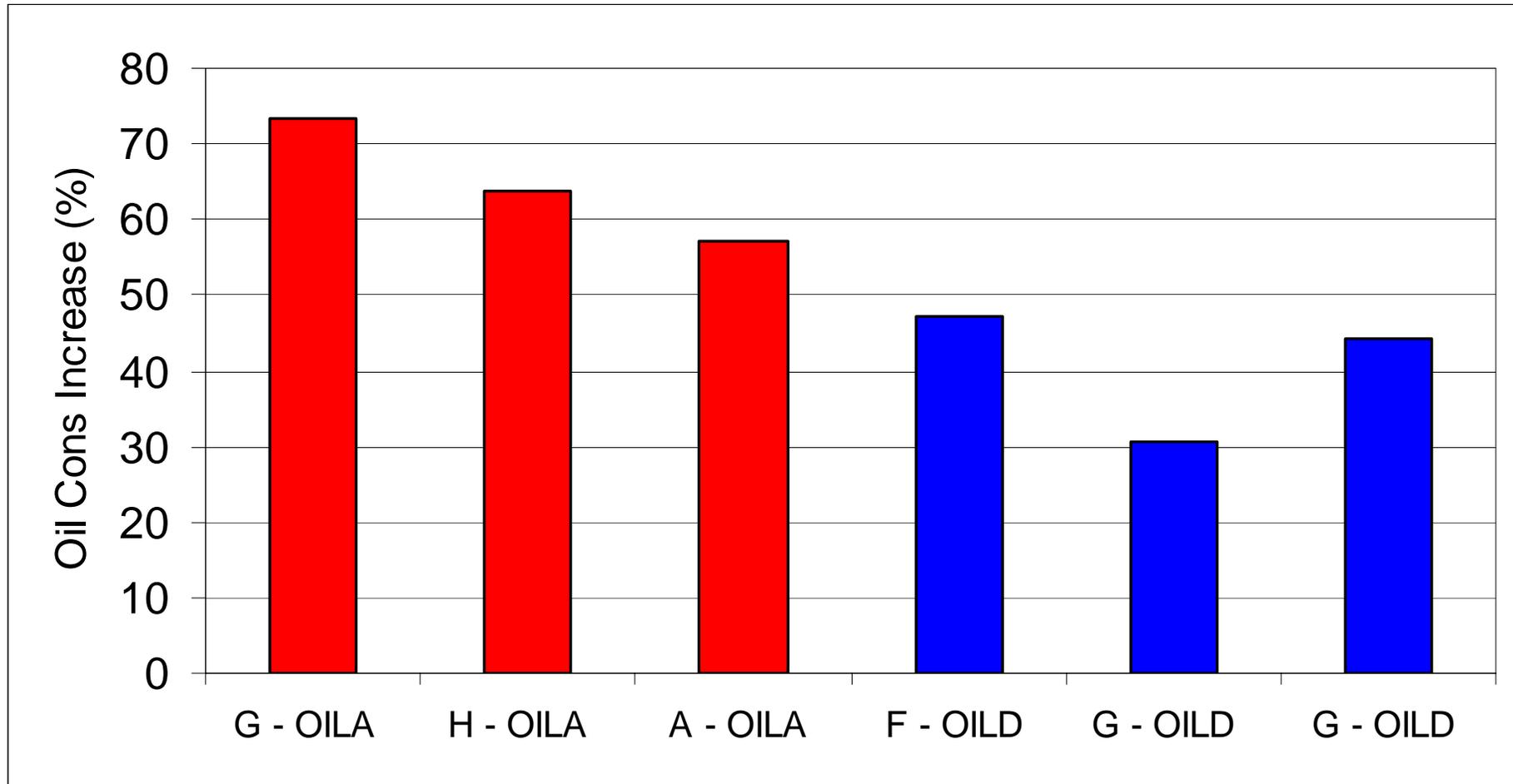


## C13 Test OC Method Status

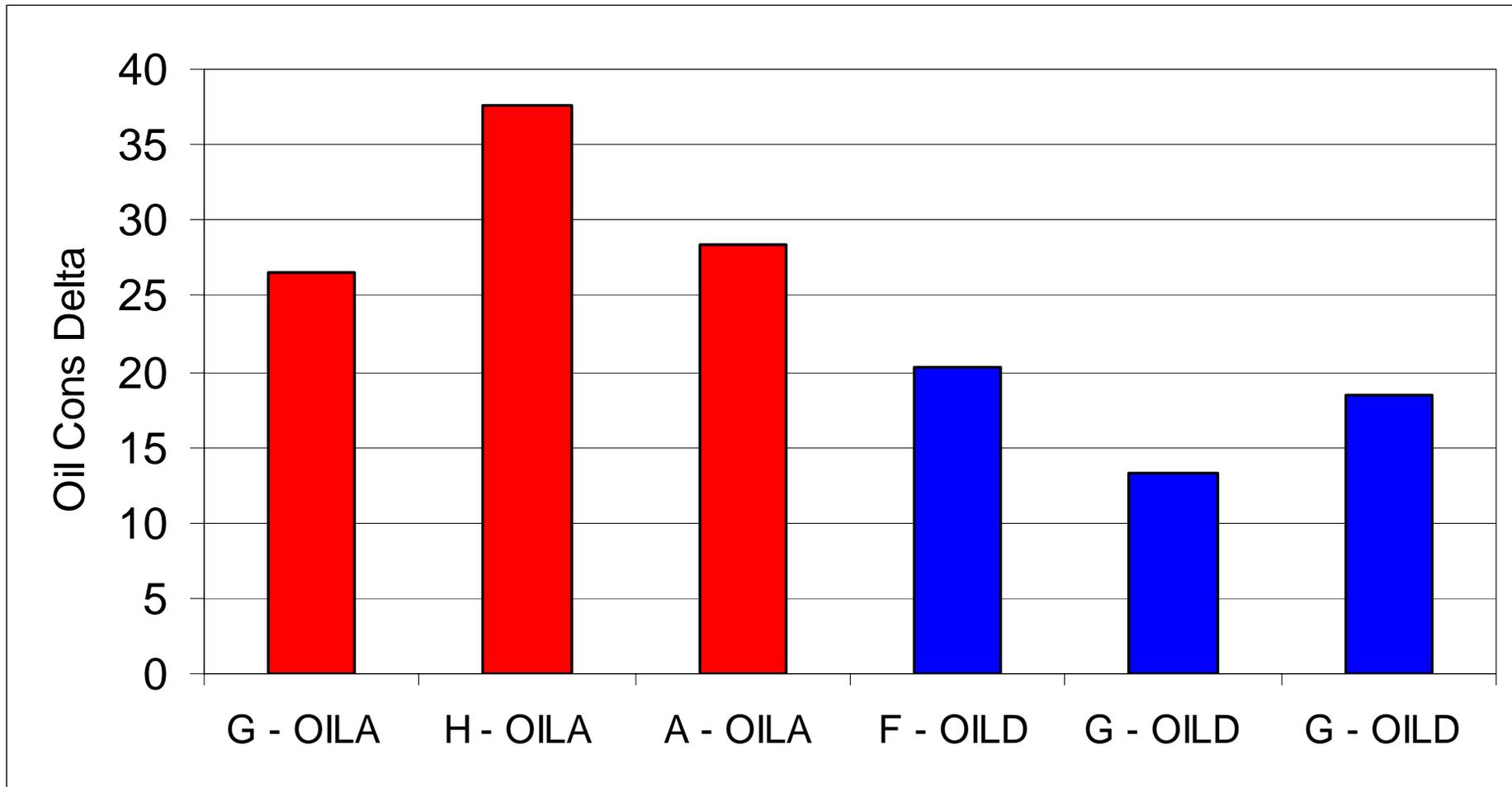
- 1. The new Oil Consumption method should be included in the matrix.**
2. With the use of the existing points in the calculation and the fact that it remedies the bias from before should enhance the credibility of the OC Delta parameter and discrimination
3. The improved method does not need to further demonstrate discrimination with the 3 runs of PC-10 Oil G as it meets the p value requirement.
4. If this is now deemed still unacceptable, than it would not be for the lack of data as other tests and parameters are not held to same level of scrutiny.



# Caterpillar C13 Test Discrimination



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	Oil A Average		Oil D Average	Discrimination p-value	
	/w Lab H	/wo Lab H		/w Lab H	/wo Lab H
<b>ATGC</b>	<b>54.9</b>	<b>53.2</b>	<b>44.4</b>	<b>0.02</b>	<b>0.04</b>
<b>ATLC</b>	<b>37.4</b>	<b>33.7</b>	<b>23.5</b>	<b>0.03</b>	<b>0.04</b>
<b>TGFAVG</b>	<b>57.7</b>	<b>52.5</b>	<b>43.3</b>	<b>0.11</b>	<b>0.07</b>
<b>ATLHC</b>	<b>19</b>	<b>15</b>	<b>6</b>	<b>0.03</b>	<b>0.04</b>
<b>PC125</b>	<b>63</b>	<b>66</b>	<b>40</b>	<b>0.02</b>	<b>0.04</b>
<b>OCDelta</b>	<b>31</b>	<b>27</b>	<b>17</b>	<b>0.03</b>	<b>0.04</b>



	OC PC125		OC Delta	
	/w Lab H	/wo Lab H	/w Lab H	/wo Lab H
<b>R<sup>2</sup> OC to ATGC</b>	<b>0.53</b>	<b>0.68</b>	<b>0.76</b>	<b>0.58</b>
<b>R<sup>2</sup> OC to ATLC</b>	<b>0.34</b>	<b>0.51</b>	<b>0.84</b>	<b>0.64</b>
<b>R<sup>2</sup> OC to ATGF</b>	<b>0.25</b>	<b>0.45</b>	<b>0.85</b>	<b>0.64</b>
<b>R<sup>2</sup> OC to ATLHC</b>	<b>0.30</b>	<b>0.49</b>	<b>0.86</b>	<b>0.67</b>



## OC vs TLHC

