



Concorde Battery Corporation

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TECHNICAL BULLETIN

Subject: Capacity Check Interval Adjustment

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Concorde's Component Maintenance Manuals (CMMs) for aircraft batteries contain the following note and warning with regards to the capacity check intervals:

NOTE: THE CAPACITY CHECK INTERVALS SPECIFIED ABOVE ARE GENERAL RECOMMENDATIONS SUITABLE FOR MOST APPLICATIONS. THE INTERVALS MAY BE ADJUSTED FOR A SPECIFIC AIRCRAFT OR FLEET ONCE THE AVERAGE BATTERY LIFE IS ESTABLISHED.

WARNING: CAPACITY CHECKS PROVIDE ASSURANCE OF CONTINUED AIRWORTHINESS OF THE BATTERY. ADJUSTMENTS TO THE FREQUENCY OF CAPACITY CHECKS SHOULD BE BASED ON CAREFUL CONSIDERATION OF FACTORS THAT AFFECT BATTERY LIFE. THESE FACTORS INCLUDE BUT ARE NOT LIMITED TO OPERATING PATTERNS, ENVIRONMENTAL CONDITIONS, AND CONFIGURATION OF THE AIRCRAFT ELECTRICAL SYSTEM. IF ANY OF THESE FACTORS CHANGE, THE BATTERY LIFE SHOULD BE RE-ESTABLISHED USING THE ORIGINAL CAPACITY CHECK SCHEDULE

This Bulletin provides guidance for proper methodology when making adjustments to capacity check intervals.

Step 1. Establish average battery life

Average battery life can only be established based on capacity test history of previous batteries in the same aircraft or fleet of aircraft. The average battery life is defined as the average months or hours that a battery is installed before capacity test failure. It will take more than a single battery's history to obtain an average life; a minimum of two batteries is required. The measured life of each battery needs to be consistent when an average life is established. If the measured battery life is not consistent, then the average life should be based on the battery with the shortest life. The average battery life so obtained is only valid as long as the aircraft electrical system configuration, operating conditions, and environmental conditions remain consistent. If any of these factors change, the average battery life should be recalibrated using historical data as described above.

Step 2. Adjust the interval for the first capacity check

Once the average battery life is established as described in Step 1, adjust the interval for the first capacity check to match the final passing interval from historical records of previously installed batteries. The capacity test intervals recommended in the CMM should be used from that point forward.



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Step 3. Consider battery replacement in lieu of capacity checks

Depending on the battery cost, average life, and cost of capacity checks, it may be more economical to replace the battery instead of performing capacity checks. If this option is utilized, the battery should be replaced at the interval corresponding to the final passing interval from historical records of previously installed batteries.

EXAMPLES

Example A. Battery is used for starting a turbine engine and is serviced per CMM 5-0171. Historical data for a specific aircraft are as follows:

First Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	18	>90%
Third	24	>90%
Fourth	30	>90%
Fifth	36	<85% (failed)

Second Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	18	>90%
Third	24	>90%
Fourth	30	Between 85 and 90%
Fifth	33	Between 85 and 90%
Sixth	36	<85% (failed)

Based on this data, the average battery life for this aircraft is 36 months. For subsequent batteries, the first capacity check would be at 33 months, and then every 6 months (if C1 >90%) or 3 months (if C1 is between 85 and 90%). Alternatively, subsequent batteries could be replaced every 33 months and no capacity checks would be necessary.



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Example B. Battery is used for starting a turbine engine and is serviced per CMM 5-0171. Historical data for a specific aircraft are as follows:

First Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	18	>90%
Third	24	>90%
Fourth	30	>90%
Fifth	36	Between 85 and 90%
Sixth	39	Between 85 and 90%
Seventh	42	<85% (failed)

Second Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	18	>90%
Third	24	>90%
Fourth	30	Between 85 and 90%
Fifth	33	Between 85 and 90%
Sixth	36	<85% (failed)

Based on this data, the average battery life for this aircraft is 36 months, even though the first battery lasted 42 months (the battery with the shortest life is selected when the historical data is inconsistent). For subsequent batteries, the first capacity check would be at 33 months, and then every 6 months (if C1 >90%) or 3 months (if C1 is between 85 and 90%). Alternatively, subsequent batteries could be replaced every 33 months and no capacity checks would be necessary.



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Example C. Battery is used for starting a reciprocating engine and is serviced per CMM 5-0171. Historical data for a specific aircraft are as follows:

First Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	24	>90%
Third	36	>90%
Fourth	48	Between 85 and 90%
Fifth	54	Between 85 and 90%
Sixth	60	<85% (failed)

Second Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	24	>90%
Third	36	>90%
Fourth	48	>90%
Fifth	60	Between 85 and 90%
Sixth	66	<85% (failed)

Based on this data, the average battery life for this aircraft is 60 months, even though the second battery lasted 66 months (the battery with the shortest life is selected when the historical data is inconsistent). For subsequent batteries, the first capacity check would be at 54 months, and then every 12 months (if C1 >90%) or 6 months (if C1 is between 85 and 90%). Alternatively, subsequent batteries could be replaced every 54 months and no capacity checks would be necessary.



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Example D. Battery is used for emergency back-up and is serviced per CMM 5-0167. Historical data for a specific aircraft are as follows:

First Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	24	>90%
Third	36	>90%
Fourth	48	>90%
Fifth	60	Between 85 and 90%
Sixth	66	<85% (failed)

Second Battery

Capacity Check	Months after Installation	C1 %
First	12	>90%
Second	24	>90%
Third	36	>90%
Fourth	48	>90%
Fifth	60	Between 85 and 90%
Sixth	66	Between 85 and 90%
Seventh	72	<85% (failed)

Based on this data, the average battery life for this aircraft is 66 months, even though the second battery lasted 72 months (the battery with the shortest life is selected when the historical data is inconsistent). For subsequent batteries, the first capacity check would be at 60 months, and then every 12 months (if C1 >90%) or 6 months (if C1 is between 85 and 90%). Alternatively, subsequent batteries could be replaced every 60 months and no capacity checks would be necessary.



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Example E. Battery is used for turbine engine starting in a large fleet of the same model of aircraft, and is serviced per CMM 5-0171. Historical data for a 5 year period was are as follows:

Average battery life = 42 months

Longest battery life = 60 months

Battery with shortest life was between 85 and 90% at 36 months and failed ($C1 < 85\%$) at 39 months.

Based on this data, the first capacity check would be performed at 36 months, and then every 6 months (if $C1 > 90\%$) or 3 months (if $C1$ is between 85 and 90%). Alternatively, batteries could be replaced every 36 months and no capacity checks would be necessary.

CONCLUSION

Obviously, there are many other examples that could be encountered. Concorde strongly recommends a conservative approach when making adjustments to the capacity check intervals, and customers are encouraged to contact us for recommendations.