CASE STUDY

MACKAY AIRPORT, QUEENSLAND, AUSTRALIA

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Mackay Airport, located in Queensland, Australia, welcomes up to 900,000 passengers every year, with more than 70 flights departing and arriving each week.

BACKGROUND

Situated in the heart of the Central Queensland resource centres, the airport services the cane growing hub and the major Bowen Basin coal mining sector as well as the popular Whitsundays tourist destination.

Mackay Airport's targeted forecast passenger numbers for 2045 is 1.3 million people. Mackay Airport and Cairns Airport are owned and operated by the North Queensland Airports Group.

THE CHALLENGE

A 2016 Pavement Condition Report on Mackay Airport's runway 14/32 proposed resurfacing which was planned for 2020/21. The Mackay Airport team started the process of identifying a suitable surface preservation treatment to sustainability extend the life of the runway, last resurfaced in 2010.

At the AAA conference in 2018, Mackay Airport provided an overview of the early onset of runway issues encountered with the use of Multigrade binder on the 2010 runway resurfacing project. They discussed the airport's journey to identify suitable surface preservation treatments to sustainably extend the life of RWY14/32.

Surface preservation treatments had not been applied on any major commercial runways in Australia since 2009. However, these treatments are commonly applied on non – critical airside pavements including runway shoulders and taxiways. Sydney Airport Corporation Limited (SACL) was also seeking expressions of interest for suitable surface preservation treatments to extend the life of the asphalt surfacing on Runway 07 /25, last resurfaced in 2004.

Compared to asphalt resurfacing of RWY14/32, the main benefit to Mackay Airport's use of RHiNOPHALT included the 90% reduction in cost and time savings.

The environmental savings include a substantial reduction in CO2 emissions due to the conservation of raw materials, transport and project time savings.

TRIALS

At the 2017 AAA Pavements and Lighting Conference in Sydney, Downer introduced RHiNOPHALT®, an innovative 'Penetrative Asphalt Preservation' (PAP), developed by ASI Solutions in the UK to SACL representatives.

This resulted in RHiNOPHALT being included in SACL trials conducted during 2017 and 2018 of several proprietary products. These trials were aimed at identifying suitable treatments that could be applied during night curfew hours (11.00pm to 5.00am), to maintain the runway surface friction characteristics and extend the life of the asphalt surfacing on the runway.

The Mackay Airport team closely monitored the SACL trials including attending the June 2018 TDZ trial.

The SACL TDZ trial was completed by Downer's Airfield team, supported by ASI personnel. The trial provided the opportunity to demonstrate the application process. This incorporated the use of an innovative 'Combi Sprayer' with synchronous spray and spread capability to ensure the runway surface friction characteristics were also maintained.

This results in life extension, increased resilience and reduction of both water ingress and FOD.

Unlike traditional Polymer Modified Emulsion (PME) treatments, RHiNOPHALT penetrates deep into the asphalt, slowing the binder oxidation and maintaining the condition of the asphalt surfacing.

Approximately 50,000m2 on SACL RWY 07/25, was treated with RHiNOPHALT by Downer during night operations in early May 2019.

To ensure that the RHiNOPHALT process is delivered strictly in accordance with ASI requirements, only approved applicators undertake the installation of RHiNOPHALT. Downer is the approved applicator for Australia and New Zealand.

TRIAL RESULTS

At the May 2019 AAA Airfield Pavements & Lighting Forum in Melbourne, the results of the SACL Surface Preservation trials conducted on RWY 07/25 were presented by Paul Rubsov, SACL Pavements Manager. The presentation included results of friction testing spanning pre, during and post application.

Downer and ASI then worked closely with the Mackay Airport team, to complete a RHiNOPHALT application on RWY 14/32 during October and November 2019.

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Observations from the Mackay Airport team following the RHiNOPHALT application included a significant reduction in FOD and less issues

resulting from ground water during high tide events.

REASONS TO RE-APPLY RHINOPHALT

During 2021, Mackay Airport commissioned Jacobs to complete a comprehensive 'Pavement inspection Report' presented in March 2022. The report concluded that the general condition of Runway 14/32 had not deteriorated significantly since 2016 as a result of the RHiNOPHALT application in 2019.

Following the performance of the initial RHiNOPHALT application in 2019, Jacobs recommendations included carrying out a further application of RHiNOPHALT to seal existing cracks and slow the development of new cracks. This would also allow time to plan for the runway resurfacing during for 2024/25.

The benefits of RHiNOPHALT include the ability to reapply and further extend the life of the asphalt surfacing by working from within the asphalt structure and causing no detriment to existing surface characteristics. The frequency of re-application is dependent on the condition of the asphalt at the time of the initial application.

Typical RHiNOPHALT reapplication frequencies are circa five years and Downer successfully completed the RHiNOPHALT re-application of runway 14/32 during night operations in October 2022, three years after the initial application.

OUTCOMES

Mackay Airport is the first runway in Australia to be re-treated with

This strategy will result in delaying further resurfacing of RWY 14/32 until 2045/46 or beyond, providing a significant economic and environmental benefit by extending the runway in service life to more than 20 years.
The outcome achieved at Mackay Airport demonstrates a commitment to look beyond challenges presented and investigate alternative solutions that will have an ongoing positive impact to both the economic and environmental sustainability of commercial airport operators.

One treatment of RHiNOPHALT asphalt preservation delivers more than 90% CO_2 savings compared to conventional asphalt mill and resurfacing.

Numerous airports who have completed runway resurfacing projects are now implementing a proactive runway maintenance strategy and have committed funds for regular RHiNOPHALT applications in their forward works programme.

The net effect of airport owners and operators implementing a proactive runway maintenance strategy will enable the airports sector to contribute 'its part in achieving the Australian Government's net zero emissions target by 2050'.
As well as Mackay Airport, RHiNOPHALT is trusted by over 70 airports around the world.

RHiNOPHALT, resulting in 50% increase to the life of the runway as well as delaying the significant capital cost and environmental impact of runway resurfacing projects.

Also, the significance of the October 2022 re-application of RHiNOPHALT on Mackay Airport RWY 14/32 has enabled:

- North Queensland Airports to delay expenditure of capital funds
- Continued safe service to the local community until the planned runway resurfacing in 2024/25.

BENEFITS

The RHiNOPHALT applications in October/ November 2019 and re-application in October 2022, has enabled North Queensland Airports (NQA) to reallocate the capital funds required for resurfacing Mackay Airport RWY 14/32 to other priority projects at both Cairns and Mackay Airports.

Following the planned resurfacing of RWY 14/32 in 2024/25, Mackay Airport will now implement a proactive runway maintenance strategy, (intervene while the asphalt surfacing is in good condition) and re-apply RHiNOPHALT every five years to maximise the life of the runway asphalt surfacing.

AUSTRALIAN AIRPORTS ASSOCIATION RECOGNITION

ASI Solutions received recognition at the Australian Airports Association (AAA) National Industry Awards 2023 being awarded the 2023 Corporate Project of the Year for Large Regional Airports for 'Sustainably Extending the Life of Mackay Airport RWY 14/32'

ASI Solutions can help all asset owners protect and preserve their investments in asphalt surfaces. Whether you own or manage airfields, toll roads, national and state highways and bridges, RHiNOPHALT will keep your asset in better condition for longer.