Sprayed seals

Sellado superficial en pavimentos aeroportuarios

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EXPERIENCIA

Australia

Pompuraaw Airport
Queensland

Airport Upgrade
East Kimberley Airport
Western Australia

Pavement Reseal
Kalbarri Airport
Western Australia

Gunnedah Airport
New South Wales

Sest Project
Essendon Fields Airport
Melbourne, Victoria

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OBJETIVOS DE LA PRESENTACION

01

Aplicación en aeropuertos

02

Procedimiento de aplicación

03

Diseño del sprayed seal

04

Aplicación en Australia

CONCEPTO ¿Qué es el **Sprayed Sealing**?

01 Aplicación

De ligante asfáltico en una o más capas

02 Dispersión

De agregados triturados en una o más capas

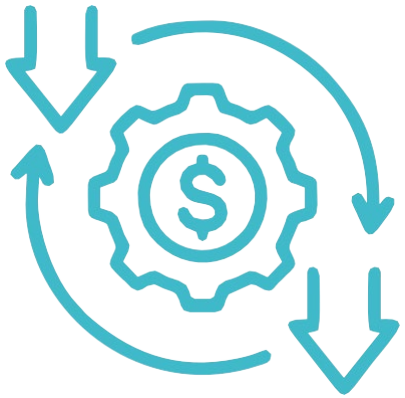
03 Compactación

De las capas aplicadas

OBJETIVOS **Sprayed Sealing**

Vida útil

Fricción y textura



Costo y beneficio

01 Aplicación
de ligante asfáltico

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02 Dispersión
de agregados

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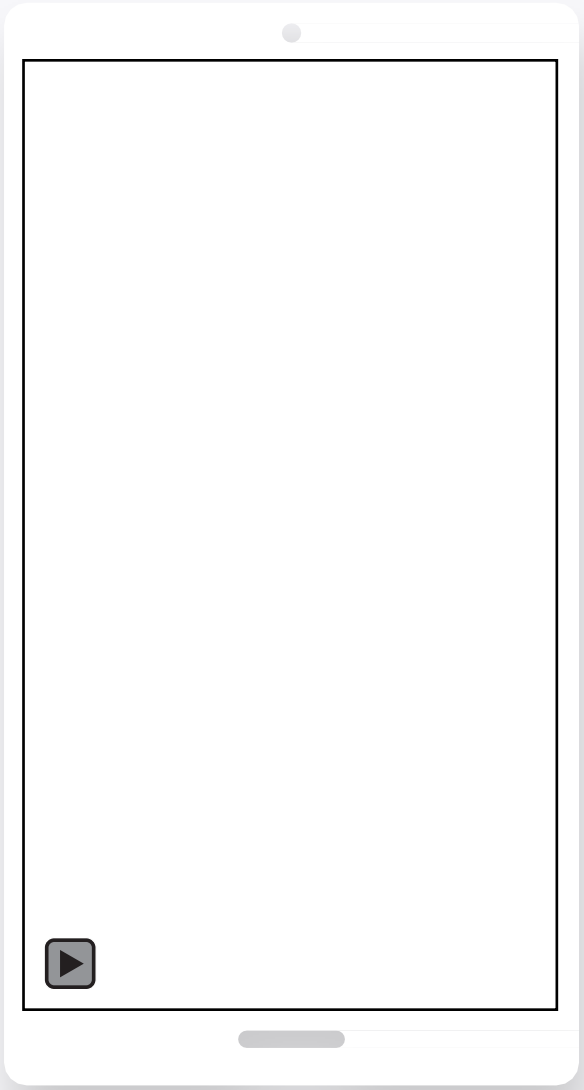
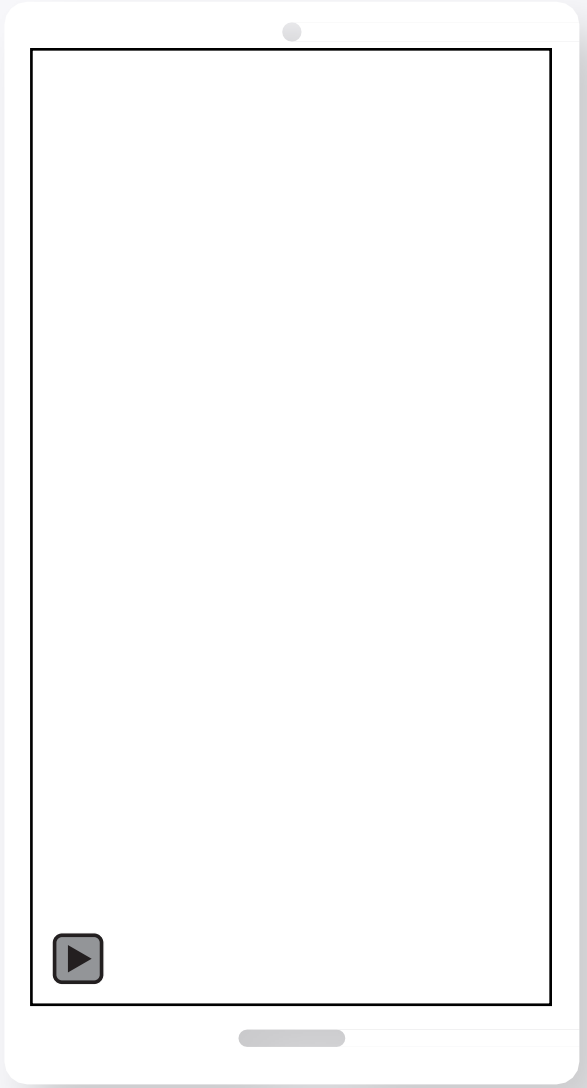
PROCESO
Constructivo

Kalbarri Airport





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03 Compactación
de capas

1h/500L

1 hora de compactación por cada 500L de ligante aplicado

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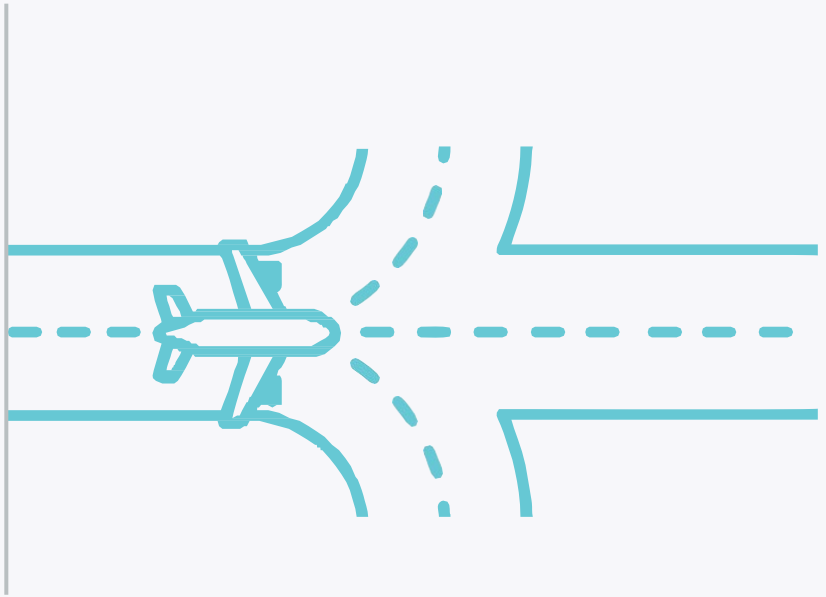
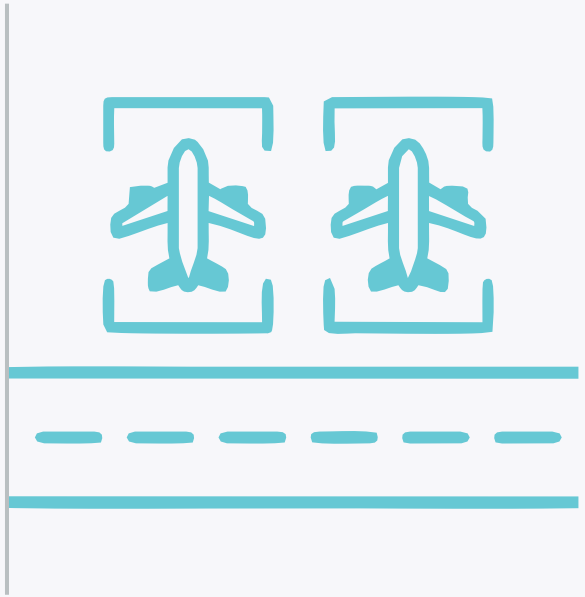
APLICACIÓN Sprayed Sealing en aeropuertos

01 Aeronave de diseño

02 Sectores a intervenir



03 Frecuencia de tráfico



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FACTORES ¿Qué tener en cuenta?

AERONAVE DE DISEÑO / FRECUENCIA

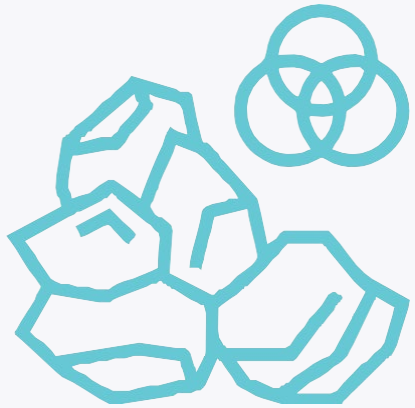
SECTOR A INTERVENIR

Suitability of seals for airport pavement surfacings

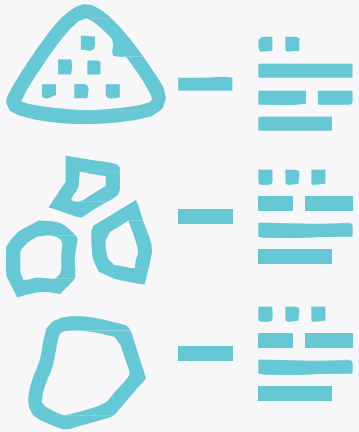
Aircraft type	**Location**		
	RUNWAY, TAXIWAY	RUNWAY ENDS, INTERSECTIONS	APRON PARKING
Airline turboprops and 40 tonne jets (Fokker F28)	Good	Good	Fair
Airline jets 60-80 tonnes (Boeing 737- 800)	Good	Fair	Fair
Airline jets '120-140 tonnes (Boeing 767- 200)	Fair	Poor	Not suited
Airline jets 250+ tonnes (Boeing 747)	Not suited		
General aviation aircraft	Good		
Military jet aircraft	Poor due to FOD and damage from narrow very high pressure tyres		
Helicopters	Fair	Good	Not suited for parking *

DISEÑO **Sprayed Sealing**

01 Tipo de tratamiento



02 Materiales Utilizados



03 Tasa de aplicación ligante/agregados

TIPO DE TRATAMIENTO **Sprayed Sealing**

01 **Single Coat Seal**
Sello de una capa

02 **Double Coat Seal**
Sello de Doble capa

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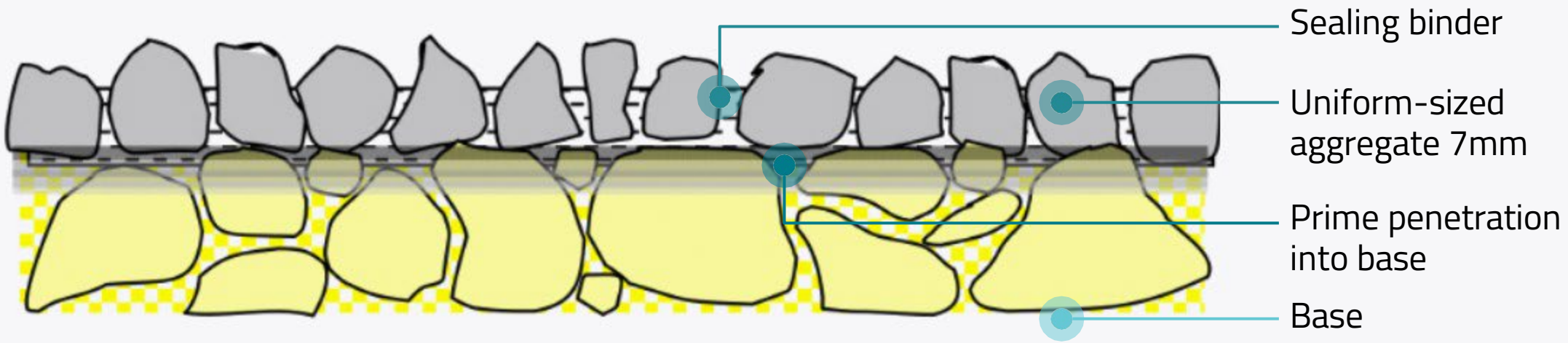
TIPO DE TRATAMIENTO **Sello de una capa**



Uso recomendado

01 Ideal para aeropuertos con bajo trafico y en zonas de bajos esfuerzos horizontales

02 Ideal para resellados de superficies en buen estado

03 Vuelos de aviación general

TIPO DE TRATAMIENTO **Sello de una capa**

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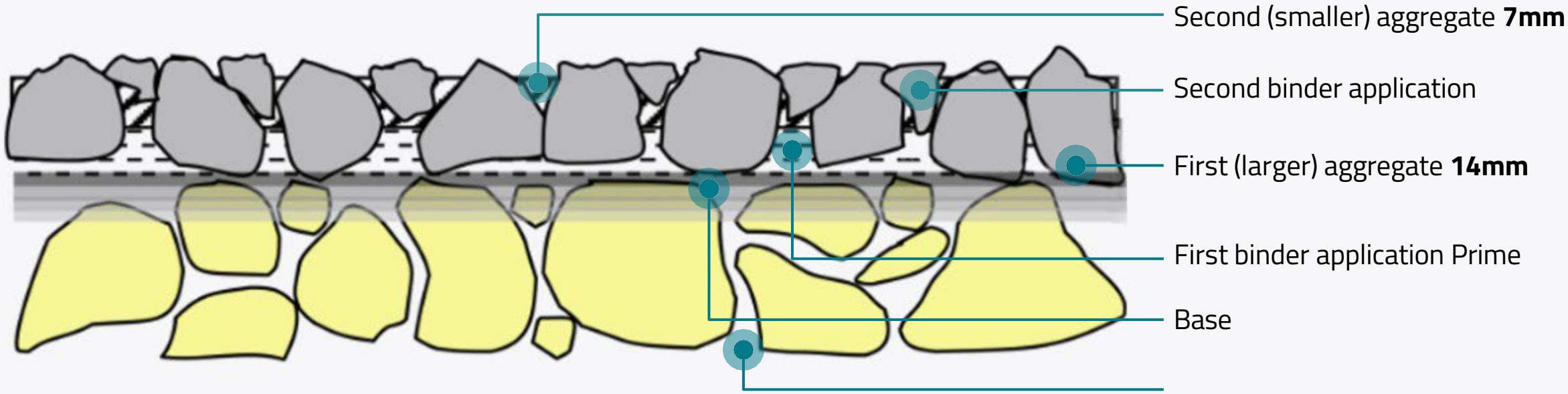
TIPO DE TRATAMIENTO **Sello de doble capa**



Uso recomendado Nuevos pavimentos o superficies en mal estado

TIPO DE TRATAMIENTO **Sellado de doble capa**

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TIPO DE TRATAMIENTO

Sellado de doble capa

Primera capa de ligante asfáltico

Primera capa de agregados

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TIPO DE TRATAMIENTO

Sellado de doble capa

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MATERIALES Ligante Asfáltico

TABLE 511.2 PROPERTIES OF BITUMEN

Property	Method of Test	Class 170		Class 320		Class 600	
		Min	Max	Min	Max	Min	Max
Viscosity at 60°C, Pa.s	AS/NZS 2341.2 or AS 2341.3	160	230	260	380	550	650
Viscosity at 135°C, Pa.s	AS/NZS 2341.2 or AS 2341.3 or AS/NZS 2341.4	0.30	0.50	0.40	0.65	0.60	0.85
Penetration at 25°C, (100g, 5s), pu (1 pu = 0.1 mm)	AS 2341.12	55	-	40	-	20	-
Density at 15°C, kg/m³	AS 2341.7	1000	-	1000	-	1000	-
Flash Point, °C	AS 2341.14	250	-	250	-	250	-
Matter insoluble in toluene (%)	AS/NZS 2341.8	-	1.0	-	1.0	-	1.0
Rolling Thin Film Oven Test (AS/NZS 2341.10)							
Viscosity of residue at 60°C as percentage of original	AS/NZS 2341.2 or AS 2341.3	-	300	-	300	-	300
Ductility at 15°C, mm	AS 2341.11	400	-	Not Applicable			
Durability Value	AS/NZS 2341.13 or WA 716.1	Refer Clause 511.06.03		Not Applicable			

TABLE 511.4 PROPERTIES OF PMB FOR SPRAYED SEALING

Binder Property	Test Method	Binder Class				
		S10E	S20E	S25E	S35E	S45R (Note 2)
Stress ratio at 10 °C Minimum	AG:PT/T125	Report	Report	Report	Report	Report
Consistency 6% at 60°C (Pa.s) Minimum	AG:PT/T121 (Note 1)	300	500	900	250	800
Stiffness at 15°C (kPa) Maximum	AG:PT/T121	140	NA	NA	180	Report
Stiffness at 25°C (kPa) Maximum	AG:PT/T121	NA	35	30	NA	NA
Compressive Limit at 70°C, 2kg mm (minimum)	AG:PT/T132	NA	NA	NA	NA	0.2
Viscosity at 165°C (Pa.s) Maximum (Note 3)	AG:PT/T111 or AS/NZS 2341.4	0.55	0.6	0.9	0.55	4.5
Flash Point (°C) Minimum	AG:PT/T112	250	250	250	250	250
Loss on Heating (% mass) Maximum	AG:PT/T103	0.6	0.6	0.6	0.6	0.6
Torsional Recovery at 25°C, 30s (%)	AG:PT/T122	22 - 50	38 - 70	55 - 80	16 - 32	25 – 55
Softening Point (°C)	AG:PT/T131	48 - 64	65 - 95	82 - 105	48 - 56	55 - 65
Segregation Value (%) Maximum	AG:PT/T108	8	8	8	8	8

MATERIALES **Agregados**

TABLE 511.9 PARTICLE SIZE DISTRIBUTION (PSD)

Sieve Size (mm)	Percentage by mass passing each sieve for each nominal size of aggregate						
	20 mm	16 mm	14 mm	10 mm	7 mm	5 mm (Note 1)	3 mm
26.50	100						
19.00	80 - 100	100					
16.00	0 - 20	80 - 100	100				
13.20	0 - 2	0 - 20	80 - 100	100			
9.50		0 - 2	0 - 20	80 - 100	100		
6.70			0 - 2	0 - 20	80 - 100	100	
4.75				0 - 2	0 - 25	80 - 100	100
2.36					0 - 2	0 - 30	80 - 100
1.18	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 – 1.0	0 - 30
0.60							0 - 5

TABLE 511.8 CRUSHED AGGREGATE PROPERTIES - SPRAYED SEALING

Property	Requirement	Test Method
Moisture Content	Dry (free of visible surface moisture)	WA 212.1 or WA 212.2
Los Angeles Abrasion Value (Note 1)		
Granite and other rock types	35% maximum	WA 220.1
Basalt	25% maximum	WA 220.1
Flakiness Index (Note 1)	35% maximum (Note 2)	WA 216.1
Average Least Dimension (Note 3)	Report	AS 1141.20.1 or AS 1141.20.2 or WA 215.1
Water Absorption	2% maximum	AS 1141 6.1
Wet Strength	100kN minimum	AS 1141.22
Wet/Dry Strength Variation	35% maximum	AS 1141.22
Stripping Test Value (Note 4)	10% maximum	AS 1141.50
Degradation Factor	50 minimum	AS 1141.25.2
Secondary Mineral Content (Note 5)	25% maximum	AS 1141.26
Petrographic Examination	Statement of suitability for use as a sealing aggregate	

MATERIALES Tasa de aplicación

Typical Binder application rates

Nominal aggregate size	Binder rate for airports	Comparative road rate (**AAPA 2000**)
14mm	2.5-2.9 L/m^2	1.7 L/m^2
10mm	2.0-2.4 L/m^2	1.2 L/m^2
7mm	1.4-1.8 L/m^2	0.9 L/m^2

Typical Aggregate spread rate

Nominal size	**Aggregate spread size**
14mm	90-110 m^2/m^3
10mm	120-140 m^2/m^3
7mm	160-180 m^2/m^3

APLICACIÓN

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Pavement Reseal Project

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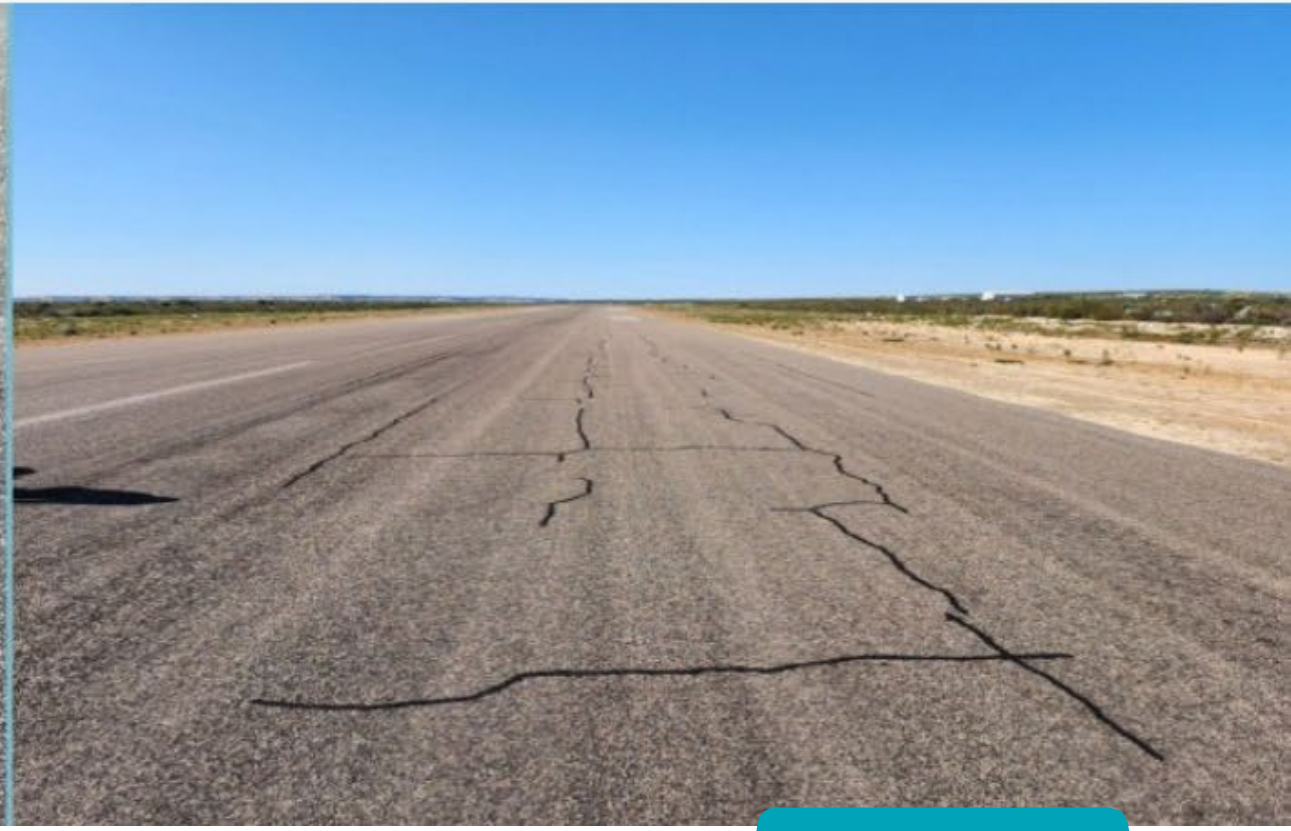
Inspección de pavimento



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Textura

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Diseño adoptado

Table 2 – Preliminary Bituminous Surfacing Requirements

Area (See Drawings for Areas)	Binder	BAR (l/m²)	Aggregate Size (mm) and application rate (m²/m³)
Runway (Central 12m)	S35E PMB or S45R	1.6 (@15°C)	7mm @ 200-220
Runway (Outer 9.2m Each Side)	S35E PMB or S45R	1.8 (@15°C)	7mm @ 200-220
Runway Turn Pads, Taxiway and Apron North	S35E PMB or S45R	1.6 (@15°C)	7mm @ 200-220
Apron South	S35E PMB or S45R	1.8 (@15°C)	7mm @ 200-220

Table 6 – Application Rate for Precoating

Nominal Size Aggregate (mm)	Application Rate (litres/m³ loose)
7	Bitumen based precoat = 10 – 14 or Distillate precoat = 7 – 10

Ligante utilizado

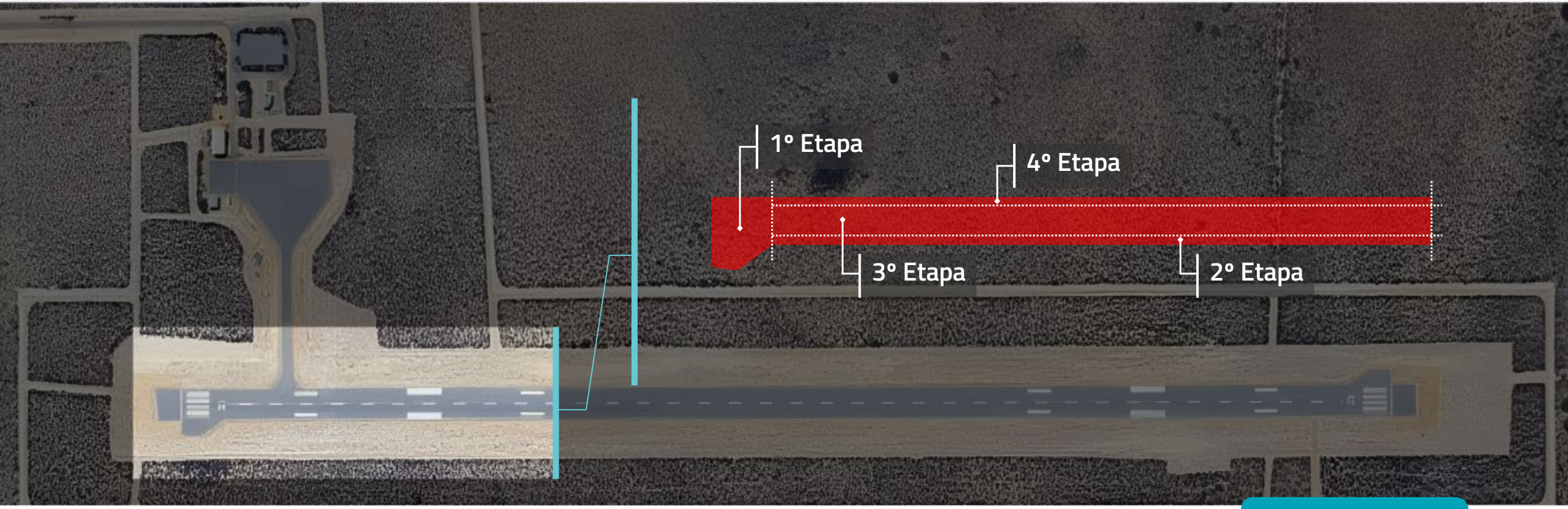
CRMB S45R

Crumb Rubber Modified Binder

ETAPABILIDAD

Kalbarri Airport

Desarrollo del proyecto



COMPACTACIÓN

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Superficie Final

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PROYECTO

East Kimberley Airport

Mejora Taxiway Alpha

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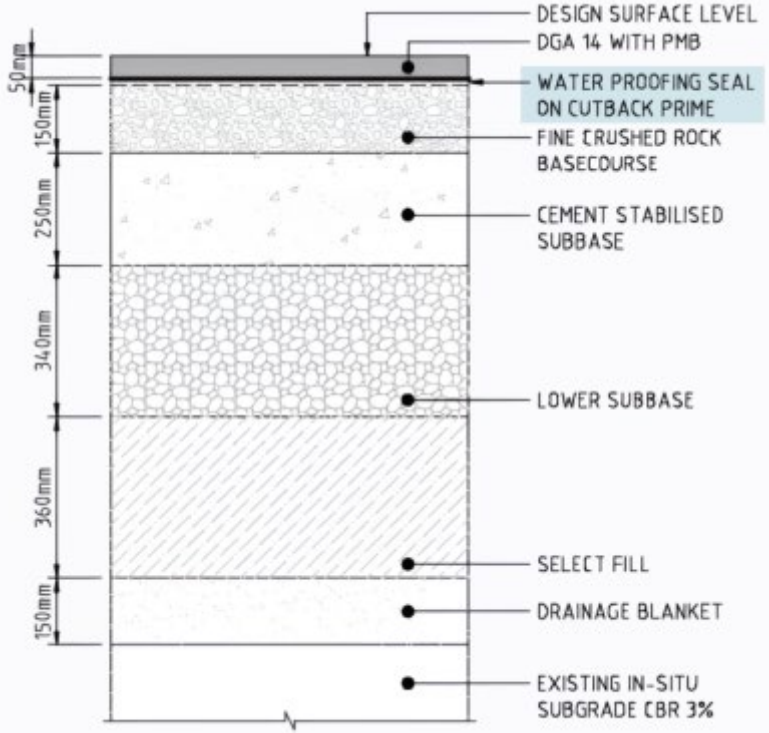
APLICACIÓN

East Kimberley Airport

Mejora Taxiway Alpha



DISEÑO

10mm Single Coat Seal para nuevo pavimento

LIGANTE

Bituminoso C320 bitumen

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APLICACIÓN

East Kimberley Airport

Mejora Taxiway Alpha

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PROYECTO

Essendon Fields Airport

Aplicación de SEST (Surface Enrichment Sprayed Treatment)

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PROYECTO

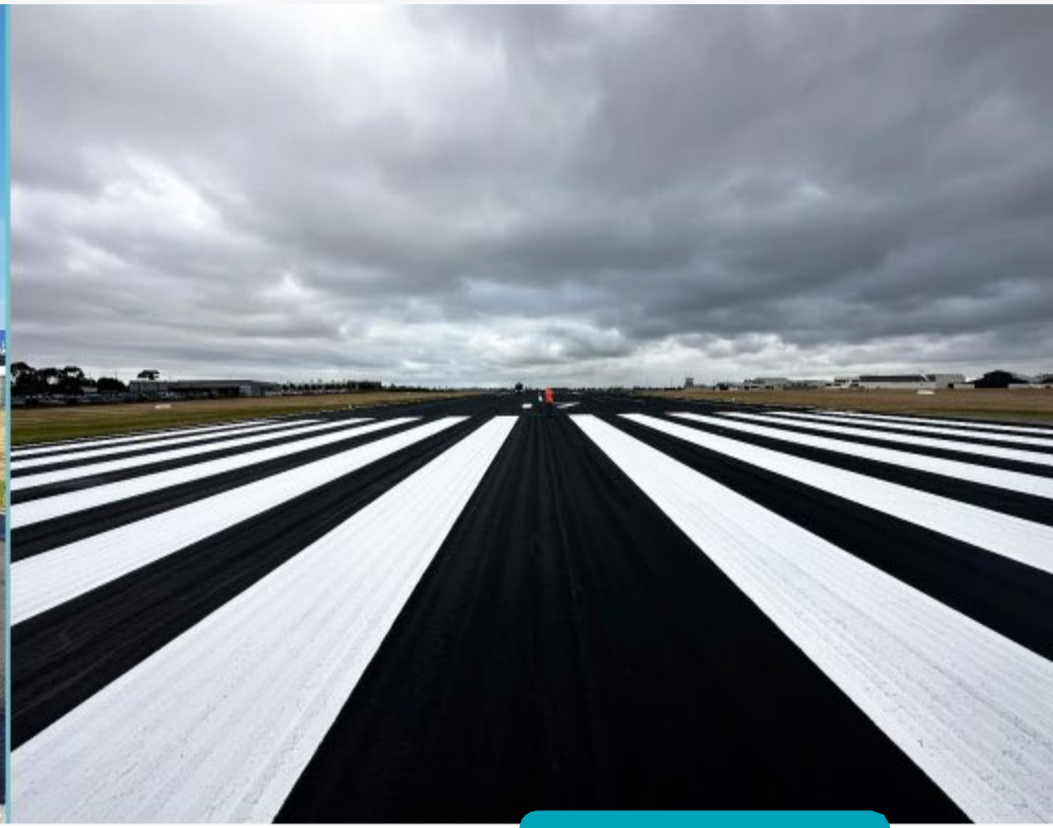
Essendon Fields Airport

Aplicación de SEST (Surface Enrichment Sprayed Treatment)

MATERIAL

PME

Emulsión Modificada con Polímeros - Arena



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Gracias!

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