ROADS Services Training Group

LOCAL AUTHORITY ROADS CONFERENCE and EXHIBITION - 2018

Lyrath Estate Hotel, Kilkenny, May 2018.

LOCAL AUTHORITY ROADS CONFERENCE and EXHIBITION – 2018

Surface Dressing
IAT Guidelines 3rd Edition Revised 2017

Jim Campbell
Chief Engineer,
Cold Chon

LASNTG Local Authority Services National Training Group

An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

Surface Dressing on the Irish Road Network of 100,112km

Roads in Ireland	Length (km)	% Surface Dressed
National Roads		
Motorway	916	0
National Primary & Secondary	4390	25%
Non National Roads		
Regional	13162	75%
Primary County	24177	82%
Secondary County	33404	86%
Tertiary County	24063	93%

Why use Surface Dressing

Surface dressing renews Skid Resistance on existing roads, contributing to user safety.

Skid resistance is particularly important on roads with poor vertical or horizontal alignment-most of our roads.

Seals the road against the effects of moisture, prolonging the pavement life.

Provides a cost effective and durable method of road surfacing.

Durability: Road Surface Dressed 20 years 7800 vpd,5.5% HGV

Guideline developments

- Foras Forbartha Report……1977
- Surface Dressing (Blue Book)……1981
- IAT Review of S/D Practice……1991
- **IAT Guidelines for S/D in Ireland**……. 2003
  (2nd Edition……. 2007)
  (3rd Edition……. 2014)
  (3rd Edition revised..2017)

IAT Guidelines for Surface Dressing 3rd Edition Revised 2017

Why revise the Guidelines

The existing print (1500 copies) run almost exhausted.

Need to reflect developments in Standards and Specifications.

Incorporate comments and observations from users.

Provide clarification where necessary ,e.g. seasonal factors, Surface Dressing on Trench reinstatement

Amendments

All references to Standards and Specifications amended throughout, references are up to date at time of printing (August 2017)

Section 1.1.3: SD on trenches-possibly two different surfaces, old & new

1.1.4: I.S. EN 12271 Surface Dressing by Contract requires CE marking provided by Contractor-SD is a Product

1.1.5: Mention of the TII Analytical Design Method

Amendments

1.2.3: Need to protect the lower layer in Double Surface dressing until the work is complete

1.2.4: Use of Inverted Double SD on HRA.

2.1.1: Refers to TII Binder Specification, now included in Appendix J

4.4.1: Design; Divide a road into sections where necessary; differing hardness, texture or local conditions

Table 4 allows more use of 2/6mm chippings on hard low trafficked roads.


Surface Dressing with2/6mm chippings
Texture Depth2.0mm

Amendments

Design Summary 1: Use 1.0 l/m^2 as basic ROS of binder for 2/6mm chippings

Design Summary 2: reduces ROS of Chippings to 3-4 l/m^2

Design Summary 3: recommends the use of pad coat and Double SD

Design Summary 4: Allows adjustments to pad coat layer

Amendments

4.6.3: Sealing Footways and Cycleways – new section and Design summary 8

7.2.2: Dribble test on site to check for blocked jets on slot jet sprayers

Bond Coats reflect TII specification.

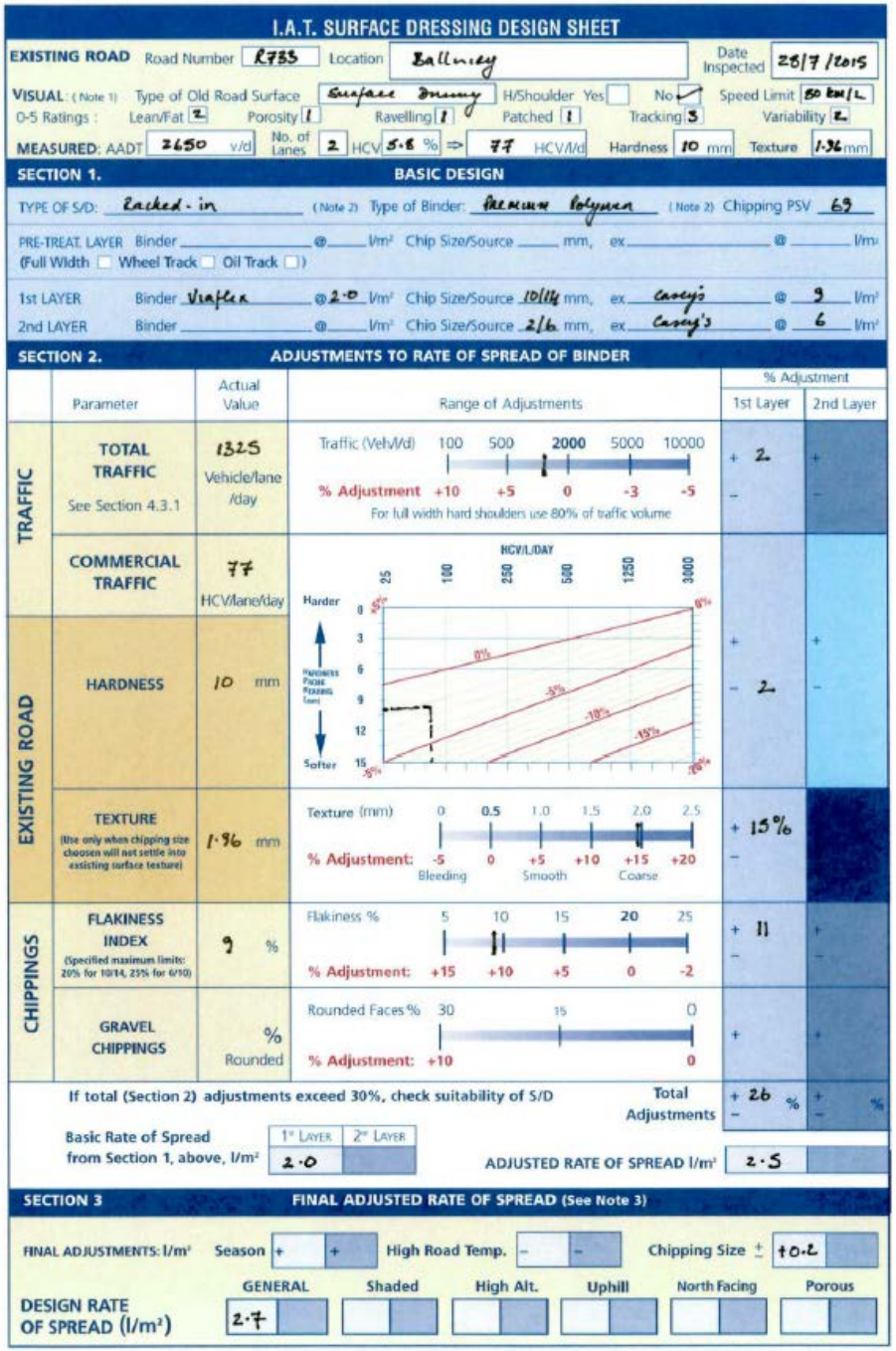
Confined sites, Footways

Design

IAT Surface Dressing

Guidelines 3rd Edition Revised

Design Sheet



I.A.T. SURFACE DRESSING DESIGN SHEET

EXISTING ROAD Road Number R733 Location Ballincy Date Inspected 28/7/2015

VISUAL: (Note 1) Type of Old Road Surface Surface Dressing H/Shoulder Yes ☐ No ☑ Speed Limit 80 km/h

0-5 Ratings: Lean/Fat 2 Porosity 1 Ravelling 1 Patched 1 Tracking 3 Variability 2

MEASURED: AADT 2650 v/d No. of Lanes 2 HCV 5.8 % ⇒ 77 HCV/l/d Hardness 10 mm Texture 1.96 mm

SECTION 1. BASIC DESIGN

TYPE OF S/D: Racked-in (Note 2) Type of Binder: Premium Polymer (Note 2) Chipping PSV 69

PRE-TREAT. LAYER Binder ____ @ ____ l/m² Chip Size/Source ____ mm, ex ____ @ ____ l/m²

(Full Width ☐ Wheel Track ☐ Oil Track ☐)

1st LAYER Binder Viaflex @ 2.0 l/m² Chip Size/Source 10/14 mm, ex Casey's @ 9 l/m²

2nd LAYER Binder ____ @ ____ l/m² Chip Size/Source 2/6 mm, ex Casey's @ 6 l/m²

SECTION 2. ADJUSTMENTS TO RATE OF SPREAD OF BINDER

	Parameter	Actual Value	Range of Adjustments	% Adjustment 1st Layer	% Adjustment 2nd Layer
TRAFFIC	TOTAL TRAFFIC (See Section 4.3.1)	1325 Vehicle/lane/day	Traffic (Veh/l/d): 100 500 2000 5000 10000; % Adjustment: +10 +5 0 -3 -5; For full width hard shoulders use 80% of traffic volume	+ 2	
	COMMERCIAL TRAFFIC	77 HCV/lane/day	HCV/L/DAY: 25 100 250 500 1250 3000; Harder ↑ Softer ↓ (Hardness Probe Reading (mm)) 0 3 6 9 12 15; 0% -5% -10% -15% -20%		
EXISTING ROAD	HARDNESS	10 mm		− 2	
	TEXTURE (Use only when chipping size choosen will not settle into existing surface texture)	1.96 mm	Texture (mm): 0 0.5 1.0 1.5 2.0 2.5; % Adjustment: -5 Bleeding, 0, +5, +10, +15 Coarse, +20 Smooth	+ 15%	
CHIPPINGS	FLAKINESS INDEX (Specified maximum limits: 20% for 10/14, 25% for 6/10)	9 %	Flakiness %: 5 10 15 20 25; % Adjustment: +15 +10 +5 0 -2	+ 11	
	GRAVEL CHIPPINGS	% Rounded	Rounded Faces %: 30 15 0; % Adjustment: +10 0		

If total (Section 2) adjustments exceed 30%, check suitability of S/D

Total Adjustments + 26 % − % | + % − %

Basic Rate of Spread from Section 1, above, l/m²: 1st Layer 2.0 | 2nd Layer

ADJUSTED RATE OF SPREAD l/m² 2.5

SECTION 3 FINAL ADJUSTED RATE OF SPREAD (See Note 3)

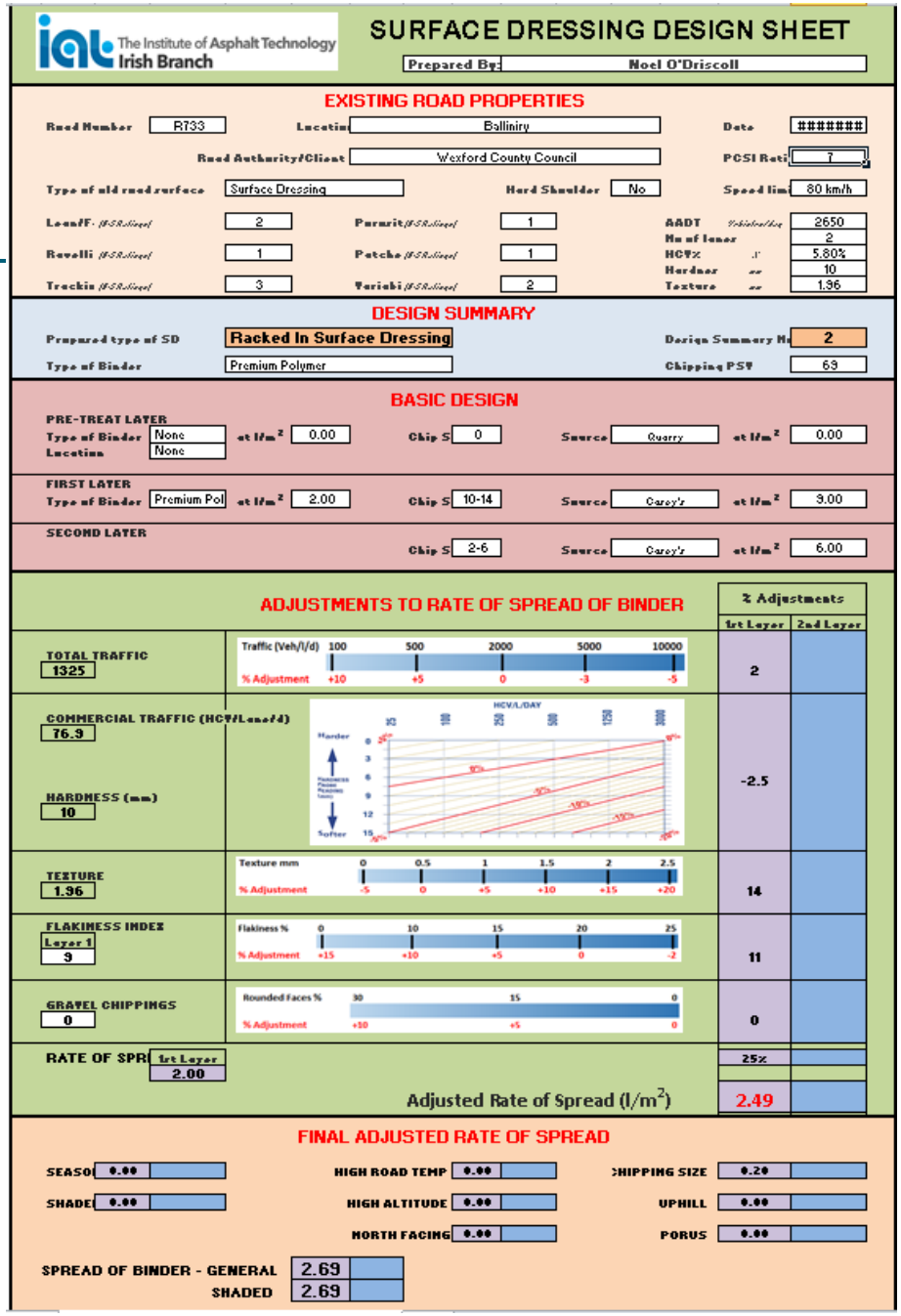
FINAL ADJUSTMENTS: l/m² Season + + High Road Temp. − − Chipping Size ± +0.2

DESIGN RATE OF SPREAD (l/m²)	GENERAL	Shaded	High Alt.	Uphill	North Facing	Porous
	2.7					

Design

IAT Surface Dressing Guidelines 3rd Edition Revised

Digital Design Sheet



The Institute of Asphalt Technology
Irish Branch

SURFACE DRESSING DESIGN SHEET

Prepared By: Noel O'Driscoll

EXISTING ROAD PROPERTIES

Road Number	R733	Location	Ballinlry	Date	########
		Road Authority/Client	Wexford County Council	PCSI Rating	7
Type of old road surface	Surface Dressing			Hard Shoulder	No
				Speed limit	80 km/h
Lon/F. (ISSAslope)	2	Permit (ISSAslope)	1	AADT	2650
				No of lanes	2
Ravelli (ISSAslope)	1	Patche (ISSAslope)	1	HCV%	5.80%
				Hardness	10
Trackin (ISSAslope)	3	Variabi (ISSAslope)	2	Texture	1.96

DESIGN SUMMARY

Proposed type of SD	Racked In Surface Dressing	Design Summary No	2
Type of Binder	Premium Polymer	Chipping PSV	63

BASIC DESIGN

PRE-TREAT LAYER							
Type of Binder	None	at l/m²	0.00	Chip S	0	Source	Quarry	at l/m²	0.00
Location	None								
FIRST LAYER							
Type of Binder	Premium Pol	at l/m²	2.00	Chip S	10-14	Source	Carey's	at l/m²	3.00
SECOND LAYER							
				Chip S	2-6	Source	Carey's	at l/m²	6.00

ADJUSTMENTS TO RATE OF SPREAD OF BINDER

		% Adjustments 1st Layer	% Adjustments 2nd Layer
TOTAL TRAFFIC 1325	Traffic (Veh/l/d) 100 500 2000 5000 10000; % Adjustment +10 +5 0 -3 -5	2	
COMMERCIAL TRAFFIC (HCV/Lane/d) 76.9 HARDNESS (mm) 10	HCV/L/DAY; Harder / Softer	-2.5	
TEXTURE 1.96	Texture mm 0 0.5 1 1.5 2 2.5; % Adjustment -5 0 +5 +10 +15 +20	14	
FLAKINESS INDEX Layer 1 3	Flakiness % 0 10 15 20 25; % Adjustment +15 +10 +5 0 -2	11	
GRAVEL CHIPPINGS 0	Rounded Faces % 30 15 0; % Adjustment +10 +5 0	0	
RATE OF SPR 1st Layer 2.00		25%	
	Adjusted Rate of Spread (l/m²)	2.49	

FINAL ADJUSTED RATE OF SPREAD

SEASO	0.00	HIGH ROAD TEMP	0.00	CHIPPING SIZE	0.20
SHADE	0.00	HIGH ALTITUDE	0.00	UPHILL	0.00
		NORTH FACING	0.00	POROUS	0.00

SPREAD OF BINDER - GENERAL	2.69	
SHADED	2.69	

Design

The Institute of Asphalt Technology
Irish Branch

SURFACE DRESSING DESIGN SHEET

Prepared By:	Noel O'Driscoll

EXISTING ROAD PROPERTIES

Road Number	R733	Location	Ballinlry			Date	28/04/2018
		Road Authority/Client	Wexford County Council			PCSI Rating	7
Type of old road surface	Surface Dressing			Hard Shoulder	No	Speed limit	80 km/h
Lean/Fat *(0-5 Ratings)*	2	Porosity *(0-5 Ratings)*	1			AADT *Vehicles/day*	2650
						No of lanes	2
Ravelling *(0-5 Ratings)*	1	Patched *(0-5 Ratings)*	1			HCV% %	5.80%
						Hardness *mm*	10
Tracking *(0-5 Ratings)*	3	Variability *(0-5 Ratings)*	2			Texture *mm*	1.96

Design

DESIGN SUMMARY

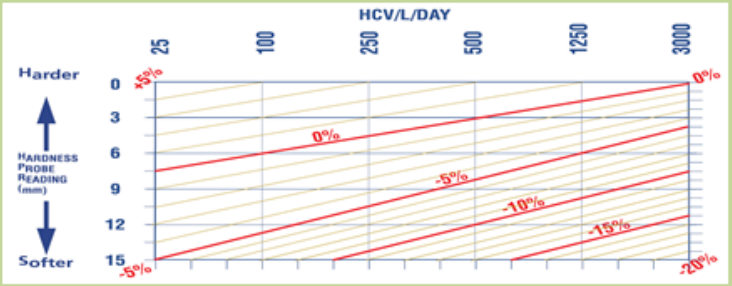
Proposed type of SD	Racked In Surface Dressing	Design Summary No	2
Type of Binder	Premium Polymer	Chipping PSV	69

BASIC DESIGN

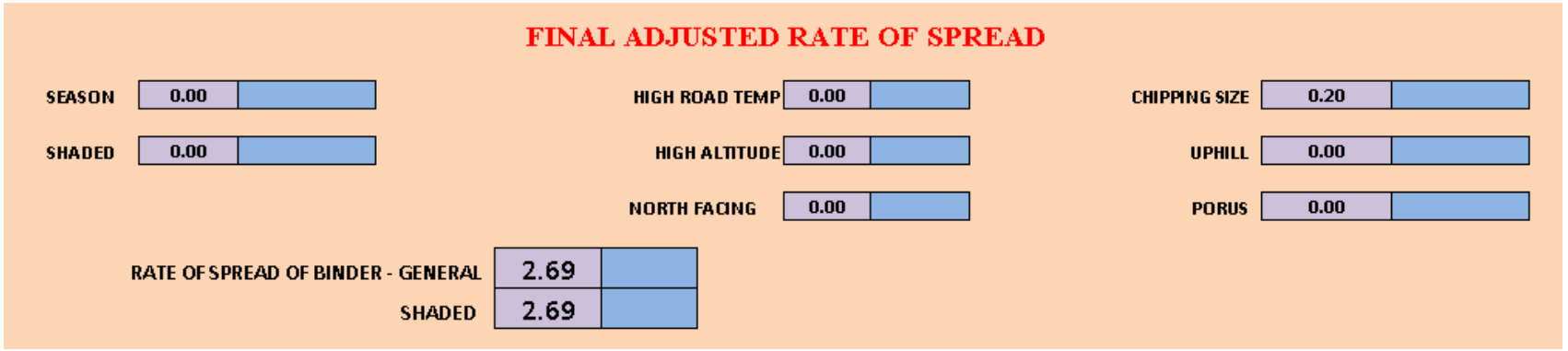
PRE-TREAT LAYER								
Type of Binder	None	at l/m^2	0.00	Chip Size	0	Source	Quarry	at l/m^2	0.00
Location	None							
FIRST LAYER								
Type of Binder	Premium Polym	at l/m^2	2.00	Chip Size	10-14	Source	Casey's	at l/m^2	9.00
SECOND LAYER								
				Chip Size	2-6	Source	Casey's	at l/m^2	6.00

Design

ADJUSTMENTS TO RATE OF SPREAD OF BINDER

		% Adjustments	
		1st Layer	2nd Layer
TOTAL TRAFFIC 1325	Traffic (Veh/l/d): 100 / 500 / 2000 / 5000 / 10000 % Adjustment: +10 / +5 / 0 / -3 / -5	2	
COMMERCIAL TRAFFIC (HCV/Lane/d) 76.85 HARDNESS (mm) 10		-2.5	
TEXTURE 1.96	Texture mm: 0 / 0.5 / 1 / 1.5 / 2 / 2.5 % Adjustment: -5 / 0 / +5 / +10 / +15 / +20	14	
FLAKINESS INDEX Layer 1 9	Flakiness %: 0 / 10 / 15 / 20 / 25 % Adjustment: +15 / +10 / +5 / 0 / -2	11	
GRAVEL CHIPPINGS 0	Rounded Faces %: 30 / 15 / 0 % Adjustment: +10 / +5 / 0	0	
RATE OF SPREAD 1st Layer 2.00		25%	
	Adjusted Rate of Spread (l/m^2)	2.49	

Design


FINAL ADJUSTED RATE OF SPREAD
SEASON
0.00
SHADED
0.00
HIGH ROAD TEMP
0.00
HIGH ALTITUDE
0.00
NORTH FACING
0.00
CHIPPING SIZE
0.20
UPHILL
0.00
PORUS
0.00
RATE OF SPREAD OF BINDER - GENERAL
2.69
SHADED
2.69

Design

APPENDIX G

Determination of Relative Chipping Size

Table G1: 10/14 (14 mm) Chippings

14 mm Sieve			12.5 mm Sieve	
% Passing	Factor 1		% Passing	Factor 2
85	7		47	13
86	6		48	12
87	5		49	11
88	4		50	10
89	3		51	9
90	2		52	8
91	1		53	7
92	0		54	6
93	-1		55	5
94	-2		56	4
95	-3		57	3
96	-4		58	2
97	-5		59	1
98	-6		60	0
99	-7		61	-1
			62	-2
			63	-3
			64	-4
			65	-5
			66	-6
			67	-7
			68	-8
			69	-9
			70	-10
			71	-11
			72	-12
			73	-13

Procedure

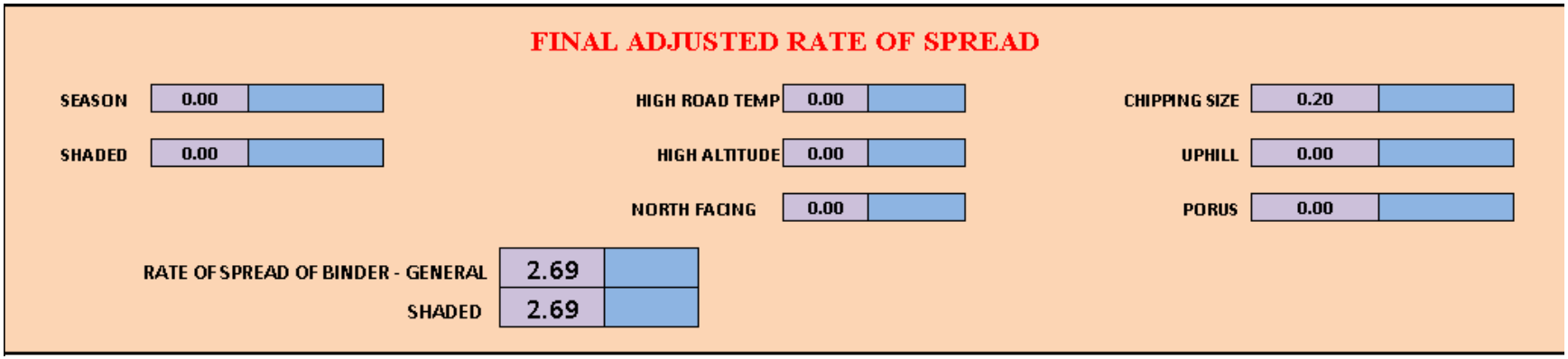
Using the grading analysis and the Table above, apply the appropriate factor for the percentage passing the 14 mm sieve and the 12.5 mm sieve. Get the average of these factors and apply the following adjustments to the rate of spread of the binder.

Factor Average	Adjustment	Chipping Size
Greater than 8	+ 0.2 l/m²	Extra Large
Between 8 to 3	+ 0.1 l/m²	Large
Between 3 to −4	0.0 l/m²	Medium
Less than −4	− 0.1 l/m²	Small

For example:

86% passing 14 mm sieve ⇒ Factor 1 = 6
56% passing 12.5 mm sieve ⇒ Factor 2 = 4
Factor Average = (F1 + F2) / 2 = 5
Adjustment in Rate of Spread = +0.1 l/m²

Design

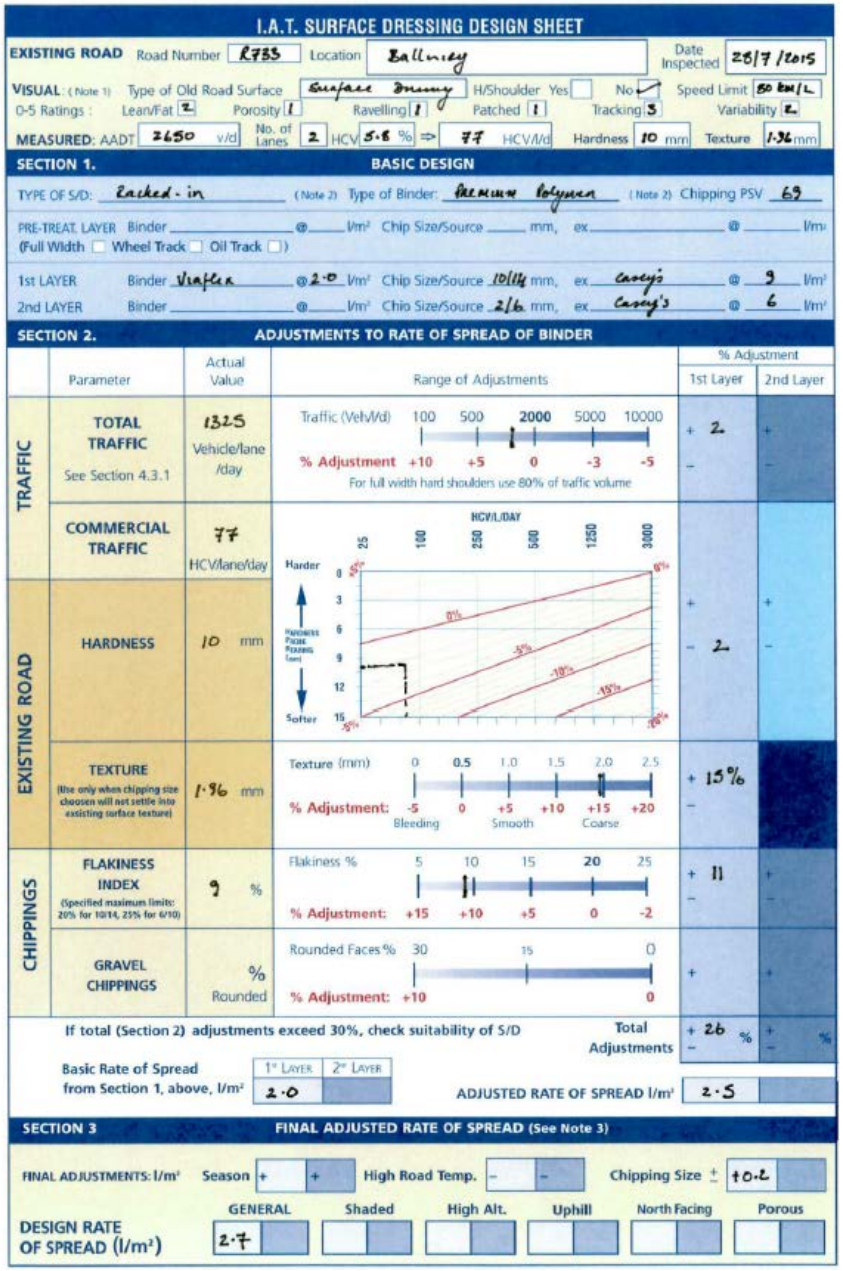

FINAL ADJUSTED RATE OF SPREAD
SEASON
0.00
SHADED
0.00
HIGH ROAD TEMP
0.00
HIGH ALTITUDE
0.00
NORTH FACING
0.00
CHIPPING SIZE
0.20
UPHILL
0.00
POROUS
0.00
RATE OF SPREAD OF BINDER - GENERAL
2.69
SHADED
2.69

Design

IAT Surface Dressing

Guidelines 3rd Edition Revised

Design Sheet



I.A.T. SURFACE DRESSING DESIGN SHEET

EXISTING ROAD Road Number R733 Location Ballincrea Date Inspected 28/7/2015

VISUAL: (Note 1) Type of Old Road Surface Surface Dressing H/Shoulder Yes ☐ No ☑ Speed Limit 80 km/h

0-5 Ratings: Lean/Fat 2 Porosity 1 Ravelling 1 Patched 1 Tracking 3 Variability 2

MEASURED: AADT 2650 v/d No. of Lanes 2 HCV 5.8 % ⇒ 77 HCV/l/d Hardness 10 mm Texture 1.96 mm

SECTION 1. BASIC DESIGN

TYPE OF S/D: Packed-in (Note 2) Type of Binder: Premium Polymer (Note 2) Chipping PSV 69

PRE-TREAT. LAYER Binder ____ @ ____ l/m² Chip Size/Source ____ mm, ex ____ @ ____ l/m²

(Full Width ☐ Wheel Track ☐ Oil Track ☐)

1st LAYER Binder Viafex @ 2.0 l/m² Chip Size/Source 10/14 mm, ex Casey's @ 9 l/m²

2nd LAYER Binder ____ @ ____ l/m² Chip Size/Source 2/6 mm, ex Casey's @ 6 l/m²

SECTION 2. ADJUSTMENTS TO RATE OF SPREAD OF BINDER

	Parameter	Actual Value	Range of Adjustments	% Adjustment 1st Layer	% Adjustment 2nd Layer
TRAFFIC	TOTAL TRAFFIC (See Section 4.3.1)	1325 Vehicle/lane /day	Traffic (Veh/d) 100 500 2000 5000 10000; % Adjustment +10 +5 0 -3 -5; For full width hard shoulders use 80% of traffic volume	+ 2 −	+ −
	COMMERCIAL TRAFFIC	77 HCV/lane/day	HCV/L/DAY 25 100 250 500 1250 3000; Harder / Softer; 0 3 6 9 12 15; 0% -5% -10% -15%		
EXISTING ROAD	HARDNESS	10 mm		+ − 2	+ −
	TEXTURE (Use only when chipping size choosen will not settle into existing surface texture)	1.96 mm	Texture (mm) 0 0.5 1.0 1.5 2.0 2.5; % Adjustment: -5 Bleeding 0 +5 Smooth +10 +15 Coarse +20	+ 15 % −	
CHIPPINGS	FLAKINESS INDEX (Specified maximum limits: 20% for 10/14, 25% for 6/10)	9 %	Flakiness % 5 10 15 20 25; % Adjustment: +15 +10 +5 0 -2	+ 11 −	+ −
	GRAVEL CHIPPINGS	% Rounded	Rounded Faces % 30 15 0; % Adjustment: +10 0	+	+

If total (Section 2) adjustments exceed 30%, check suitability of S/D

Total Adjustments + 26 % − | + − %

Basic Rate of Spread from Section 1, above, l/m² — 1st Layer 2.0 | 2nd Layer

ADJUSTED RATE OF SPREAD l/m² 2.5

SECTION 3 FINAL ADJUSTED RATE OF SPREAD (See Note 3)

FINAL ADJUSTMENTS: l/m² Season + + High Road Temp. − − Chipping Size ± +0.2

	GENERAL	Shaded	High Alt.	Uphill	North Facing	Porous
DESIGN RATE OF SPREAD (l/m²)	2.7					

The Institute of Asphalt Technology
Irish Branch

SURFACE DRESSING DESIGN SHEET

EXISTING ROAD PROPERTIES

Road Number	1234	Location	Anywhere	Date	15/02/2018
		Road Authority/Client	A Local Authority	PCSI Rating	
Type of old road surface	Clause 810	Hard Shoulder	No	Speed limit	80 km/h
		Porosity (0-5 Ratings)	0	AADT (Vehicles/day)	300
				No of lanes	2
				HCV% (%)	5.00%

DESIGN SUMMARY

Proposed type of SD	Sealing Unbound Layers/Bituminous Cold Mixes	Design Summary No	7
Type of Binder	Cationic 70	Chipping PSV	60+

BASIC DESIGN

PRE-TREAT LAYER								
Type of Binder	Catonic 70	at l/m²	0.00	Chip Size	0	Source	Quarry	at l/m²	0.00
Location	None							
FIRST LAYER								
Type of Binder	Catonic 70	at l/m²	2.20	Chip Size	10-14	Source	Quarry	at l/m²	9.50
SECOND LAYER								
Type of Binder	Catonic 70	at l/m²	1.80	Chip Size	6-10	Source	Quarry	at l/m²	7.00

ADJUSTMENTS TO RATE OF SPREAD OF BINDER

		% Adjustments	
		1st Layer	2nd Layer
FLAKINESS INDEX Layer 1: 14 / Layer 2: 18 When using a 2-6mm chip use a value of 20 for flakiness	Flakiness % 0 10 15 20 25 % Adjustment +15 +10 +5 0 -2	6	2
GRAVEL CHIPPINGS 0	Rounded Faces % 30 15 0 % Adjustment +10 +5 0	0	0
RATE OF SPREAD 1st Layer: 2.20 / 2nd Layer: 1.80		6%	2%
	Adjusted Rate of Spread (l/m^2)	2.33	1.84

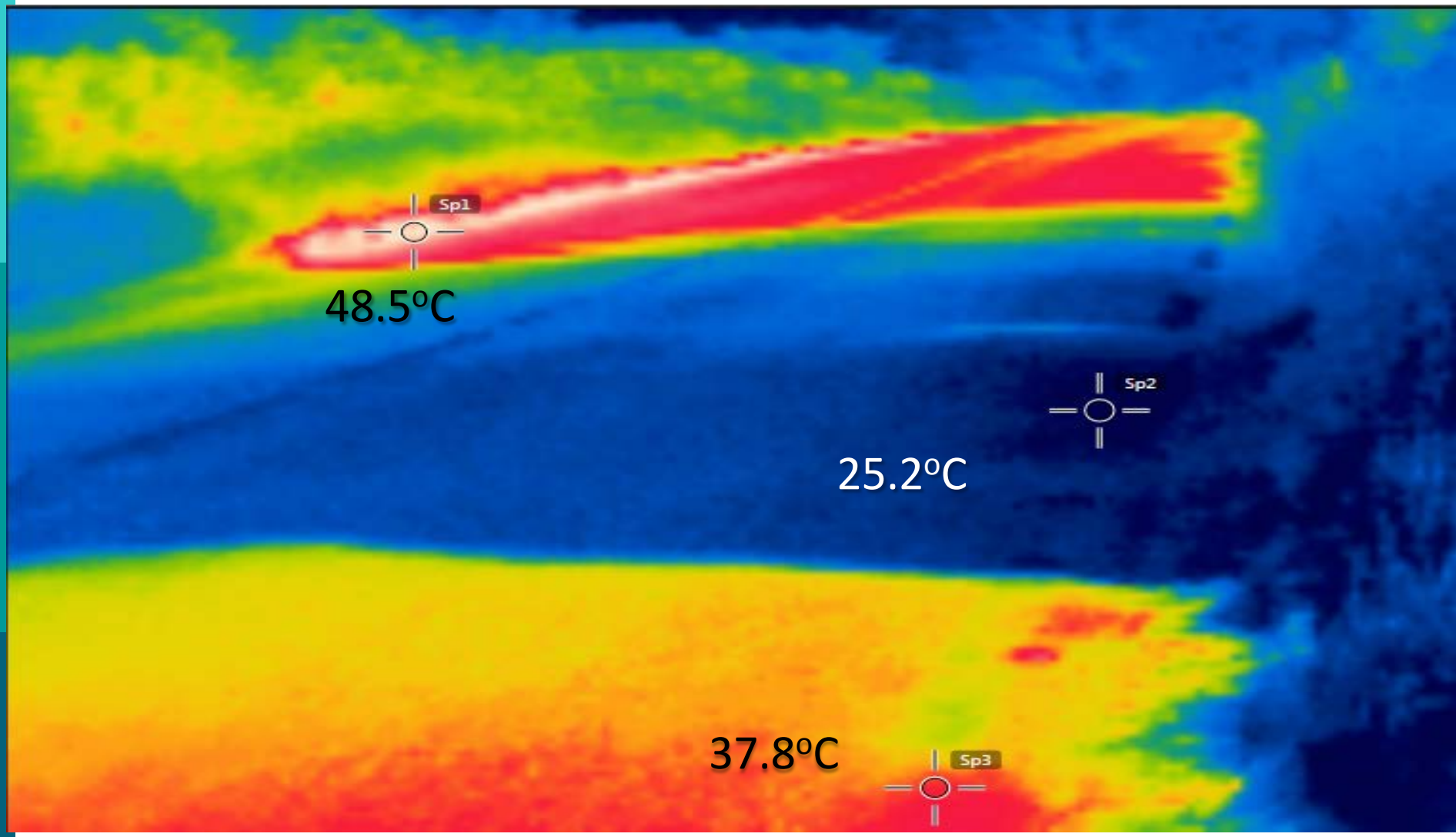
FINAL ADJUSTED RATE OF SPREAD

SEASON		0.00	HIGH ROAD TEMP		0.00	CHIPPING SIZE	0.10	0.00
SHADED	0.20	0.10	HIGH ALTITUDE	0.00	0.00	UPHILL	0.00	0.00
			NORTH FACING	0.00	0.00	PORUS	0.00	

RATE OF SPREAD OF BINDER - GENERAL	2.43	1.84
SHADED	2.63	1.94

NOTES

10/14mm Chipping racked with 2/6mm Finished surface,
Texture Depth typically 2.75-3mm


Sp1
48.5°C
Sp2
25.2°C
37.8°C
Sp3

For Successful Results

Get the Book, order from the IAT Irish Branch website

Read and study it.

Attend the Training Courses.

Apply the Guidelines to the work.

Plan and execute the work in Season.

Applications- Inverted Double SD on HRA

Road with variable texture-pretreatment

SD on Microsurfacing on worn HRA

Thank You
Have a Safe and Successful Season

Jim Campbell
phone 087 2359772
jim.campbell@coldchon.ie