



Rincent BTP international

Water thickness measuring device



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Rincent BTP international

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■ Context of development

■ Device's presentation

■ Commercial aspects

■ Rincent BTP, a french independent company which includes:

- 8 international agencies (Madrid, Recife, Cairo, Bamako, Dubai, Dakar, Antananarivo, Casablanca,)
- 16 agencies in France

■ Activities:

□ Analysis, tests, technical inspections, assesment, Technical studies and consultancies (Civil engineering, Infrastructures...)

□ Airport field:

- ✓ Pavement auscultation (Radar, HWD, Skid resistance, Determination of IS and ACN/PCN Indexes...)
- ✓ Assesment/ Follow up of civil engineering (Buildings and pavements)
- ✓ Searching of undergrounds networks and anomalies (tank, ammunition, cavity...)
- ✓ Developement and sale of equipment.



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□ Paris (Roissy/Orly), Budapest, Mexico, Tunisia (Seven airports), Malia (Five airports), Lamaka

□ Rincent BTP is a member of the french mirror group (FMG) for the European standards

□ A national actor in several research and development projects

□ A member of Eurolab (European federation of national associations of measurement, testing and analytical laboratories.)

□ A member of Proavia (Association to promote French industry in the field of aviation and airport development.)



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- A water thickness measuring device: Why?

- Functional grip and Opérational grip:

- ✓ Intrinsic feature of the runway's surface.

- ✓ In operational phase, Features directly affected by contaminants like water

- No means to measure the depth of water with reliability and accuracy.

- Historic

- ✓ Idea come from Infraero Recife during a meeting in 2007.

- ✓ Rincent BTP developed this device with Supelec, Best French university of Physical measure.

- ✓ Today, airports all over the world are interested.





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▪ A water thickness measuring device: Why?

□ DGAC studies:

186 planes out of the runway in ten years because of no estimation or a bad evaluation of water thickness (Most of the time use of a rule or coins)

□ Field G of SNOWTAM/NOTAM (information to the pilot) asks to publish this information in millimeter. Airport managers are in charge of issuing it.

*And you, What kind of technic are you using?
Are you satisfied by results?*



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Norms

✓ Today , no norm because no reliable device. Norm, only to uniformise a procedure of measurement in a second time. Ex: Skid measure

✓ An immediate problem of responsibility for airport managers in case of accident, when pilots ask for this value. (Cf STAC's Study)
Give a safe and good information, to get the best safety image and credibility.

Measure certification (Reliability, repetability accuracy)

✓ Rincent BTP is working with LNE, French institute of measure certification,.. Partnership with Inmetro in Brasil



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□ Recommendations and references

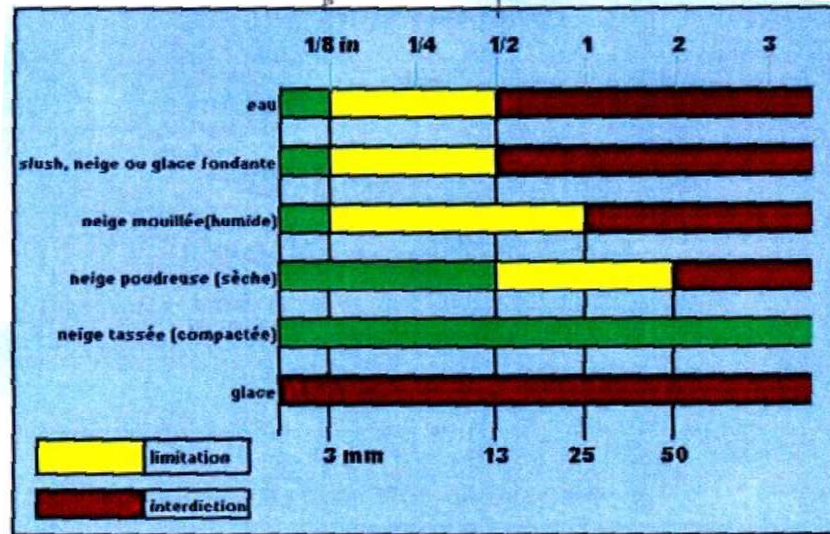
✓ ICAO, In Anex 14.

2.9.4 Recommendation.—*Whenever water is present on a runway, a description of the runway surface conditions on the centre half of the width of the runway, including the possible assessment of water depth, where applicable, should be made available*

✓ EJAA (2000) and plane's manual: More than 3mm ,change of landing procedure, more than 13 mm closure of the runway.



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B-737

		1/4 INCH SLUSH OR STANDING WATER DEPTH									
		GROSS WEIGHT REDUCTION LB									
FLAP POS		1		2		5		10		25	
PRESS ALT		SL	4000	SL	4000	SL	4000	SL	4000	SL	4000
NORMAL F.L. LIMITED GROSS WT 1000 LB	80	3400	3200	2300	3200	1800	3000	1600	2700	1500	2500
	90	3500	4300	3400	4100	3400	3700	3300	4100	3000	3900
	100	4500	5400	4500	5100	4500	4900	4400	4900	4300	4900
	110	5700	6700	5500	6700	5200	5900	5200	6200	5100	6100
	115	6100	7300	6100	7300					5100	6100

		1/2 INCH SLUSH OR STANDING WATER DEPTH											
		GROSS WEIGHT REDUCTION LB											
FLAP POS		1		2		5		10		15		25	
PRESS ALT		SL	4000	SL	4000	SL	4000	SL	4000	SL	4000	SL	4000
NORMAL F.L. LIMITED GROSS WT 1000 LB	80	6000	6600	5300	6600	4800	6400	4500	6000	4300	5600	4200	5900
	90	8100	9000	7300	8600	7100	8100	6800	8100	6300	8300	6300	8300
	100	9400	11200	9300	10900	9200	10700	9000	10400	9000	10400	9000	10400
	110	12200	13900	12100	13500	12100	13400	12000	13200	12000	13000	12000	13000
	115	13200	15000	13000	15000								

FIGURE 3

(See appropriate aircraft flight manual for the correct information.)

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▪ Physical principle of working

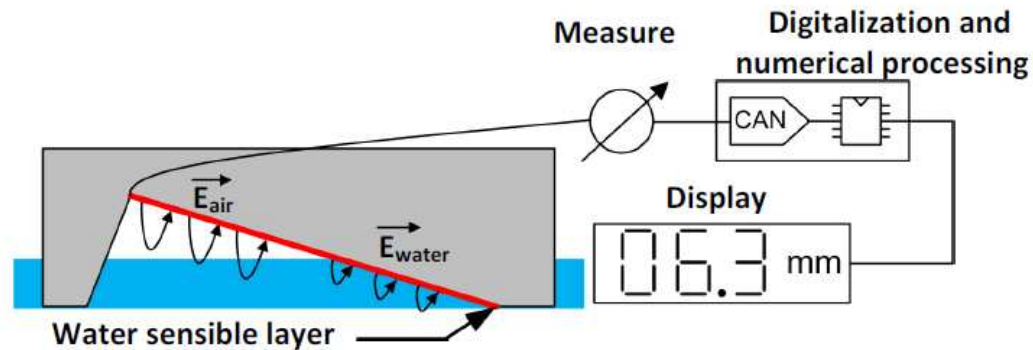


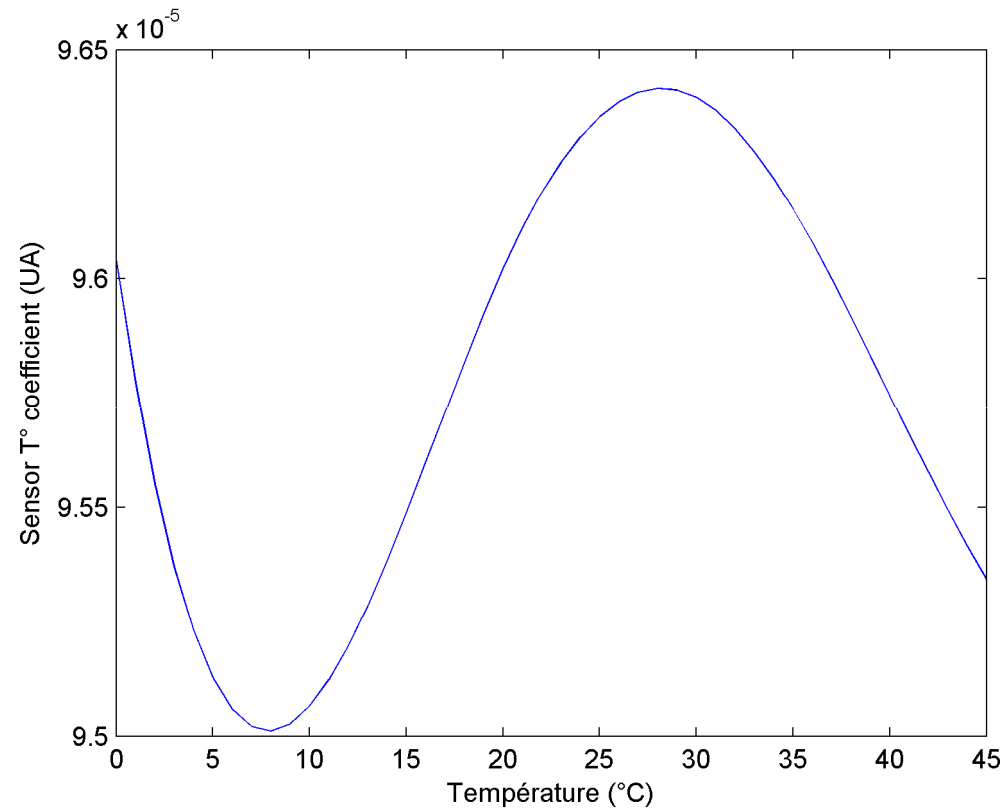
Figure 13 : Measurement principle.

- ❑ Uses electric properties of water: Permittivity
Electrical property of the sensor is a linear function of water depth.
(Principle of a variable capacity)
- ❑ Adapted numerical process integrates and converts analogic datas in numeric datas.
- ❑ Insensitive to water salinity. (Until saturation)



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□ Temperature's influence



Relation between water depth and electrical properties modulated by temperature → Temperature sensor included.

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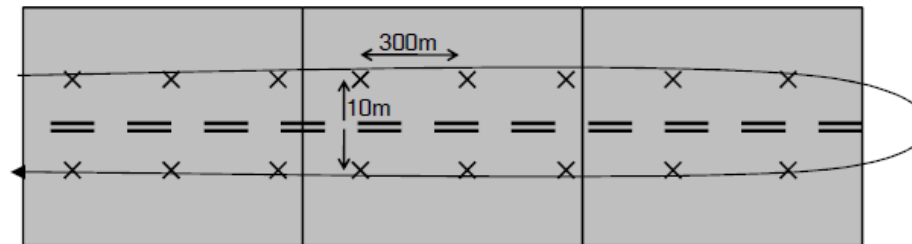
▪ Procedure of measurement.

☐ Classical procedure

- ✓ Calibration
- ✓ Carrying out of measures. Inspired by CAA's rules:

1.2.2 Contaminant is measured every 300 metres, between 5 and 10 metres either side of the runway centre-line and away from the effects of rutting. The measurement is reported in millimetres as a mean for each third of the runway. The contaminant will be described as Ice, Dry Snow, Compacted Snow, Wet Snow, Slush or Standing Water.

1.2.3 Runway conditions are required to be reported every 30 minutes for as long as such conditions prevail, which cater for a scenario of changing weather. (AIP AD1.2.2 SnowPlan)



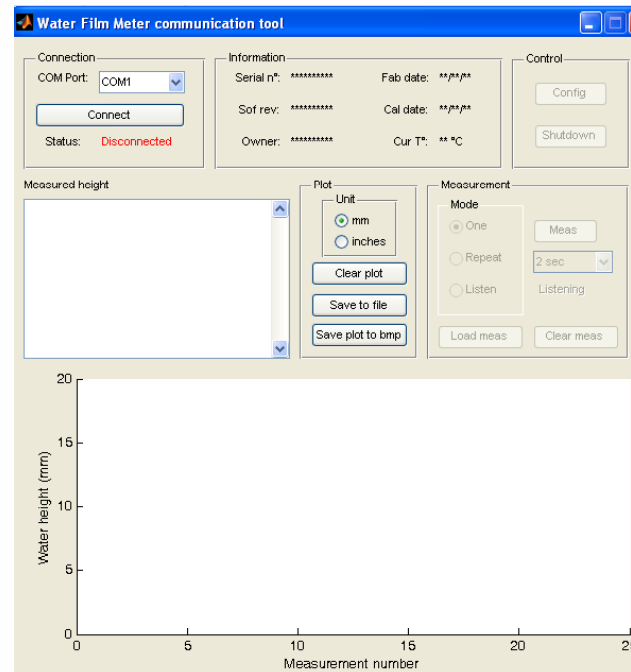
- ✓ Pick up of measures on dedicated sheet (date, hour, runway etc.)
- ✓ Average on each third part of the runway (ICAO's recommendation art.2.9.11, Snowtam, CAA's rules)



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▪ Options

- ✓ Wireless and software
- ✓ GPS Localisation





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N°	Désignation	Qté	Unité	Prix unitaire	Prix Total H.T.
<i>1</i>	<i>Boitier de mesure d'épaisseur de l'eau</i>				
1.1	(1) Boitier de mesure de l'épaisseur d'eau WFME-200 précision 0,2 mm	1	U	10 815,00 €	9 815,00 €
1.2	(1) Boitier de mesure de l'épaisseur d'eau WFME-200 précision 0,5 mm	1	U	6 750,00 €	6 750,00 €
1.3	Garantie constructeur 1 an (1) Pièce et main d'œuvre.	1	U	Inclue	
				TOTAL H.T	€

<i>2</i>	<i>Options</i>				
2.1	Transmission sans fil et sauvegarde des données + logiciel de base.		U	985,00€	
2.2	GPS (Localisation des points de mesure)		U	810,00€	
2.3	Valise renforcée de stockage et de transport		U	395,00€	
2.4	Capteur de recharge		U	3 515,00€	
2.5	Re-calibration		U	1 789,00€	
2.6	Personnalisation de l'interface (langage, drapeau,...)		U	345,00€	
				TOTAL H.T	€



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Important:

*Device has been developed due to a specific demand.
But it's an open structure. We can work with you to study
your specific needs and adapt it.*

Thank you for your attention!

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