EASA
European Aviation Safety Agency

Montenegro
Civil Aviation Agency

AERODROMES WORKSHOP
Podgorica, Montenegro
6 – 7 November 2014

Examples on different deviations from the CS

Predrag Sekulic, Airports Regulations Officer

Your safety is our mission.

An agency of the European Union

EASA
European Aviation Safety Agency

Examples on different deviations from the CS

The examples are just for illustration and are not the opinion of EASA!

Your safety is our mission.

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A Key Term: Certification basis (CB)

BR

CS

ER

GM

IR

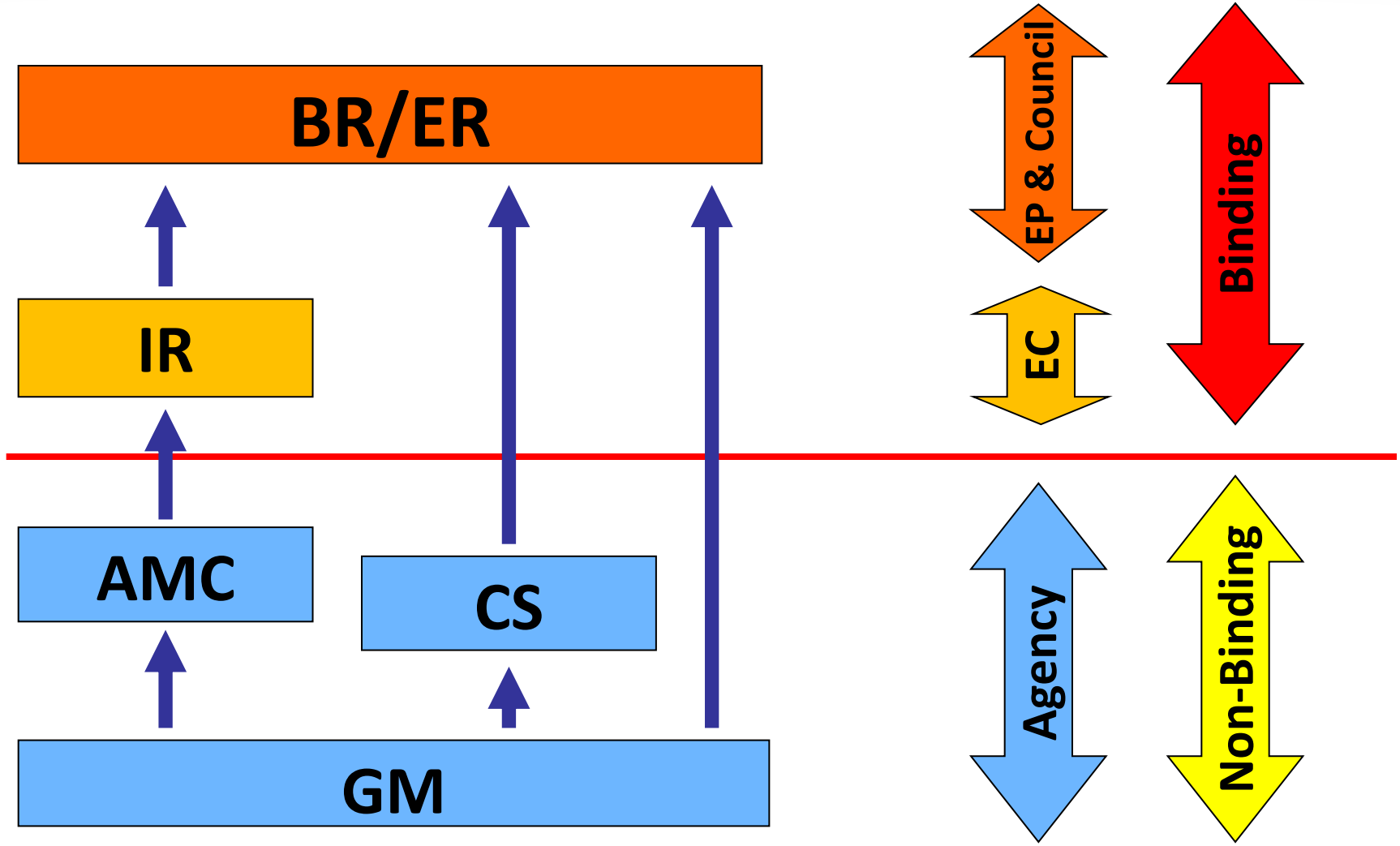
SC

AMC, GM

ELOS

DAAD

Regulatory framework



Structure of the rules & provisions

Council-EP

Reg. 216/2008
Essential requirements (Va & Vb)

Binding

EC

Implementing Rules
Reg. 139/2014, App 6 Mar 2014

EASA

Acceptable Means of Compliance & Guidance material to IR
ED Decision 2014/012/R, App 6 Mar 2014

Certification Specifications & Guidance Material to aerodrome design Book 1 & 2
ED Decision 2014/012/R, App 6 Mar 2014

Non-binding

Structure of the rules & provisions

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Flexibility: Certification Basis

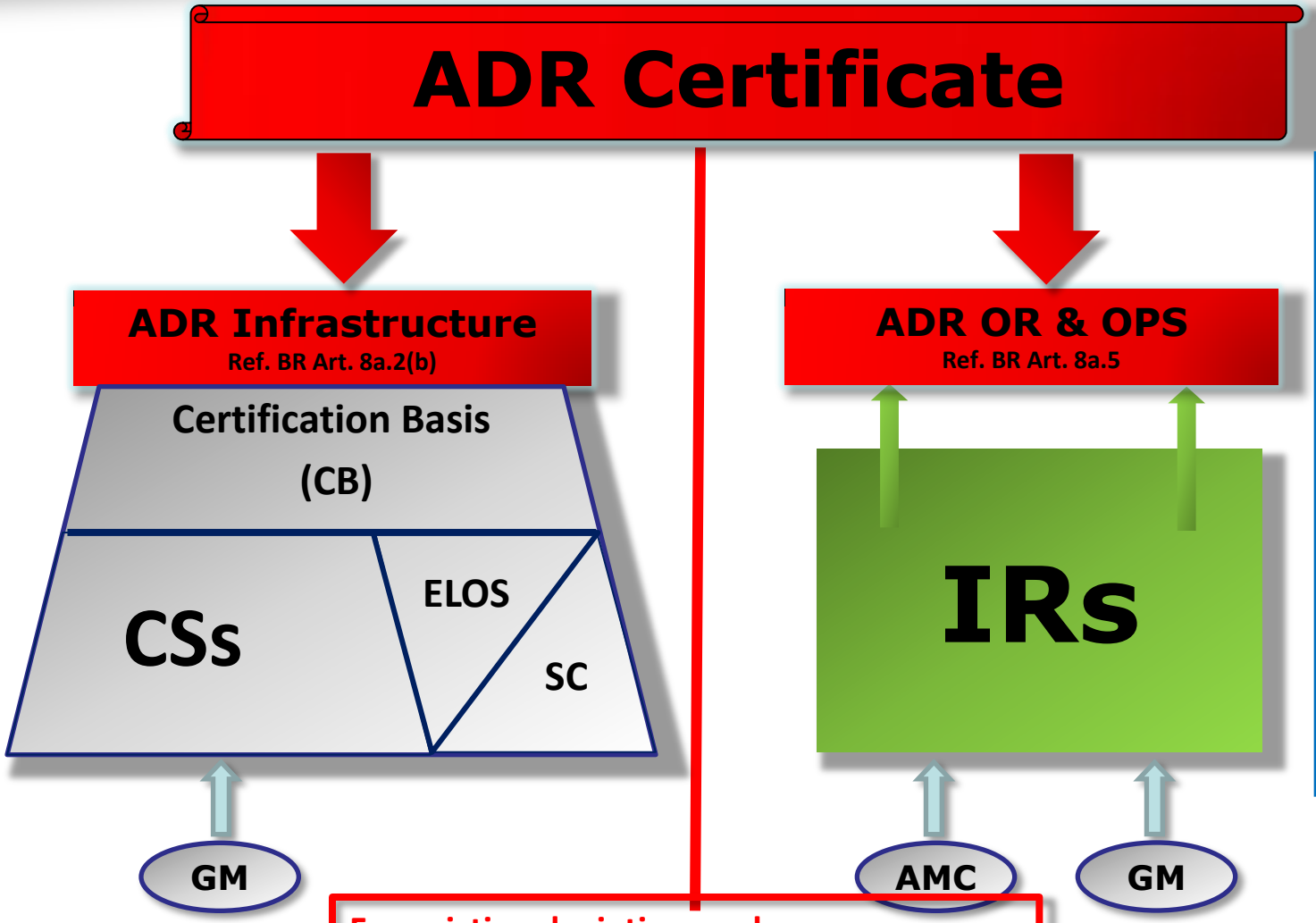
How do the EASA rules work?

in a world in which…..

“if you know one airport, you know one airport!”

(unknown)

Flexibility: Certification Basis



IRs = Implementing Rules

CSs = Certification Specifications

ELOS= Equivalent Level of Safety

SC= Special Condition

GM= Guidance Material

AMC= Acceptable Means of Compliance

For existing deviations only:

Additional option of acceptance via "DAAD" mechanism Ref. Cover Regulation, Art. 7

CB – deviation elements

Equivalent level of safety (ELOS)

(see ADR.AR.C.020)

- **Part of the CB**
- **Can apply to any deviation from the relevant CS;**
- **Only when CAA accepts the possibility to demonstrate ELOS;**
- **Applicant must undertake Safety assessment;**
- **Applicant has to demonstrate ELOS;**
- **ELOS must be documented;**
- **When accepted by the CAA would not be linked to conditions.**

CB – deviation elements

Special condition (SC)
(see ADR.AR.C.025)

- Part of the CB
- Can only be prescribed by Competent Authority
- When the CS is inappropriate or inadequate because:
  - CS cannot be met due to physical, topographical or similar limitations related to the location of the aerodrome;
  - the aerodrome has novel or unusual design features; or
  - experience from the operation of that aerodrome or other aerodromes having similar design features has shown that safety may be endangered.
- Technical specifications, limitations, procedures to ensure compliance with the Essential Requirements

CB – deviation elements

Deviation Acceptance and Action Document (DAAD) (see Art.6)

- Until end 2014 CAA may issue DAAD;
- Only a possibility for CAA if ELOS or Special Condition impossible;
- Only for Pre-existing deviation/s (pre-2014)
- Safety assessment to be done;
- Regular review needed;
- Competent Authority specifies the period of acceptance;
- Part of the Certificate and NOT part of the CB;
- Competent Authority compiles the evidence.

Certification basis (CB)

Chapter D – Taxiways

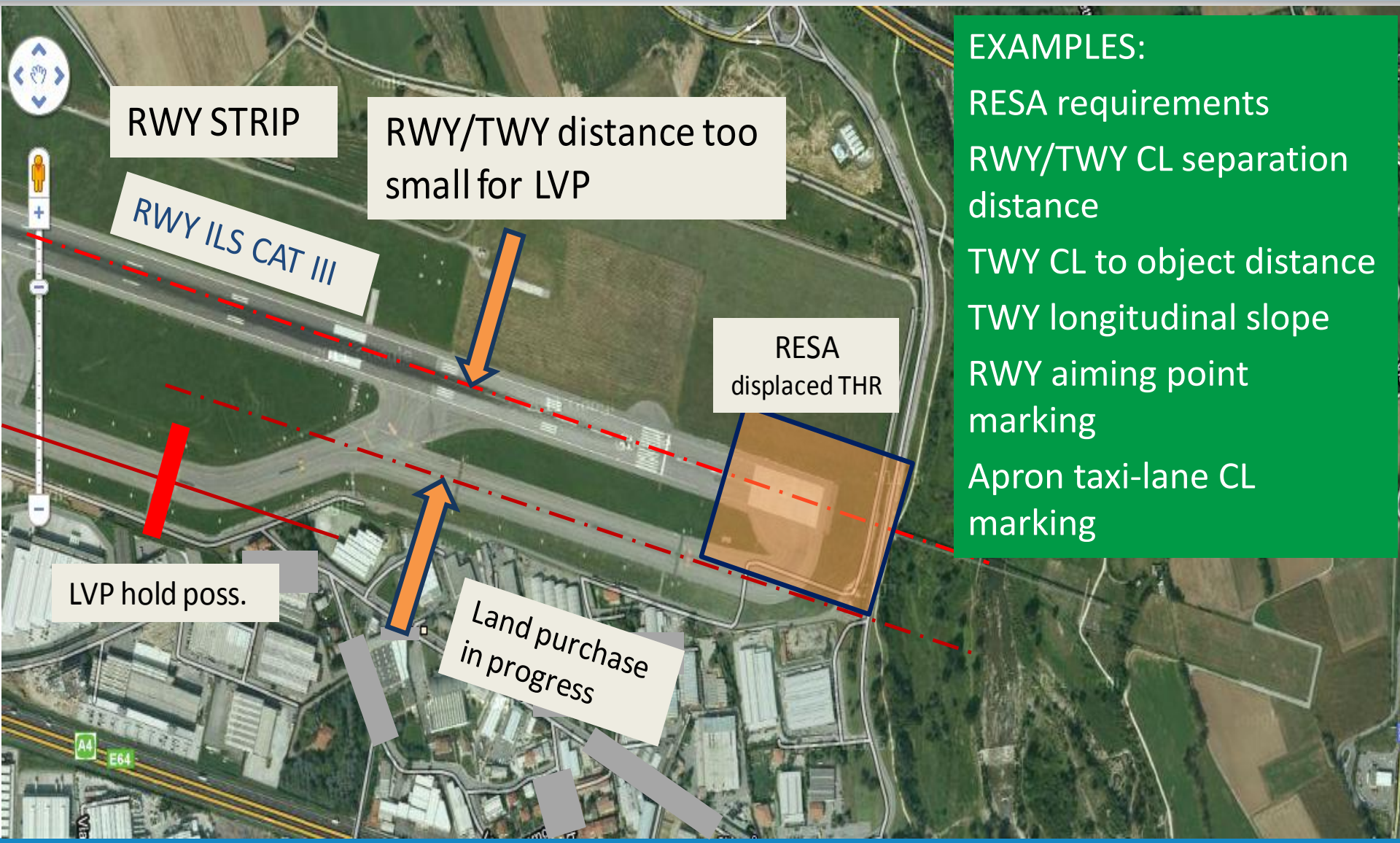
Please complete the table below (dimensions in metres)

Taxiway Designator	Code	Width	Strip Width

CS ADR-DSN.	Certification Specification (CS)	CS Met Yes / No / N/A
D.240	Taxiways general	Choose an item.
D.245	Width of taxiways	Choose an item.
D.250	Taxiway curves	Choose an item.
D.255	Junction and intersection of taxiways	Choose an item.
D.260	Taxiway minimum separation distance	Choose an item.
D.265	Longitudinal slopes on taxiways	Choose an item.
D.270	Longitudinal slope changes on taxiways	Choose an item.
D.275	Sight distance of taxiways	Choose an item.
D.280	Transverse slopes on taxiways	Choose an item.


It's Your Turn!
Join the discussion, please!

Assessment of deviations



EXAMPLES:

- RESA requirements
- RWY/TWY CL separation distance
- TWY CL to object distance
- TWY longitudinal slope
- RWY aiming point marking
- Apron taxi-lane CL marking

Example 1: RESA

RESA – EASA CS

ADR CS

CS ADR-DSN.C.210 Runway End Safety Areas

(a) The safety objective of the runway end safety area (RESA) is to minimise risks to aircraft and their occupants when an aeroplane overruns or undershoots a runway.

(b) A runway end safety area should be provided at each end of a runway strip where:

(1) the code number is 3 or 4; and

(2) the code number is 1 or 2 and the runway is an instrument one.

ADR CS

CS ADR-DSN.C.215 Dimensions of runway end safety areas

(a) Length of RESA

A runway end safety area should extend from the end of a runway strip to a distance of at least 90 m and, as far as practicable, extend to a distance of:

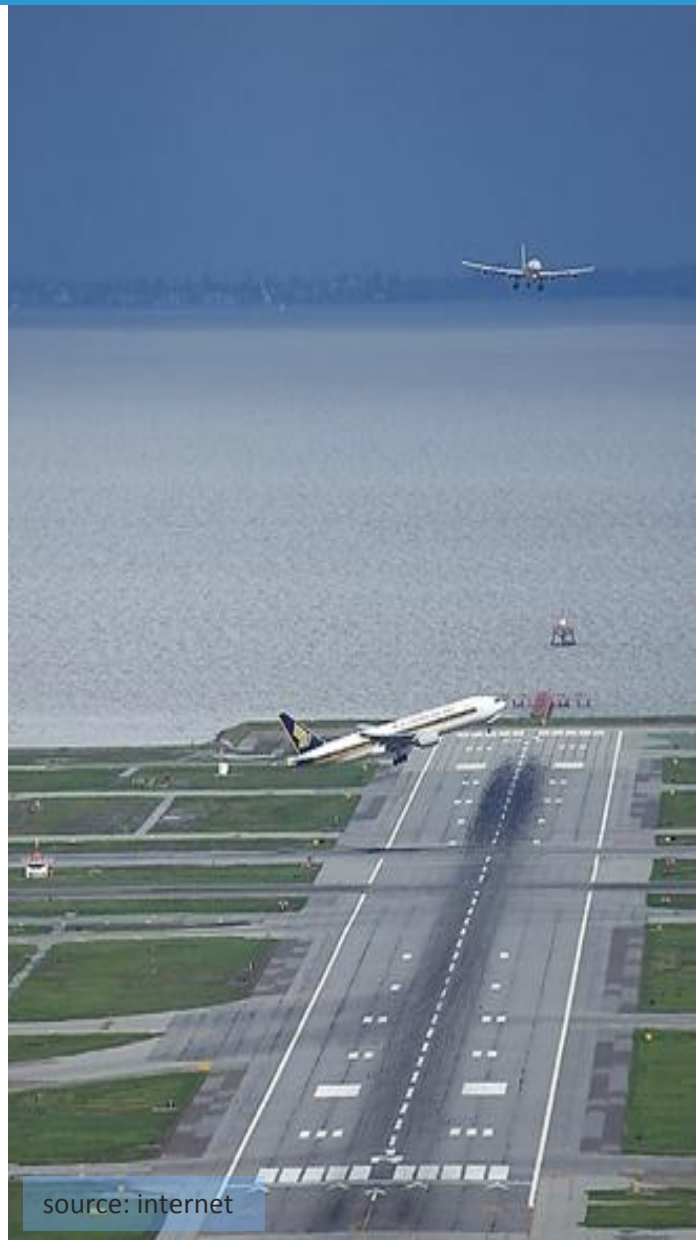
(1) 240 m where the code number is 3 or 4 and

(2) 120 m where the code number is 1 or 2 and the runway is an instrument one;

(b) Notwithstanding the provisions in (a) above, the length of the runway end safety area may be reduced where an arresting system is installed, based on the design specifications of the system.

(c) Width of RESA

The width of a runway end safety area should be at least twice that of the associated runway and, wherever practicable, be equal to that of the graded portion of the associated runway strip.

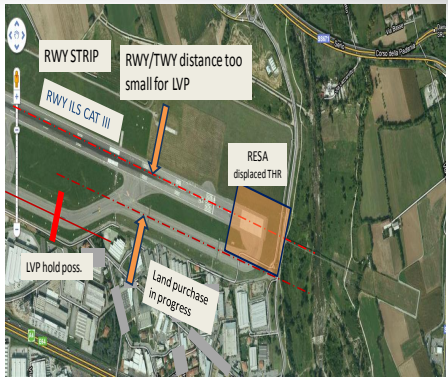


source: internet

Example 1: RESA

Situation:

- Aerodrome does not comply with the CS requirement of the length of RESA
- The RESA could only achieve a distance of 60 m



3 different possibilities of handling the deviation:

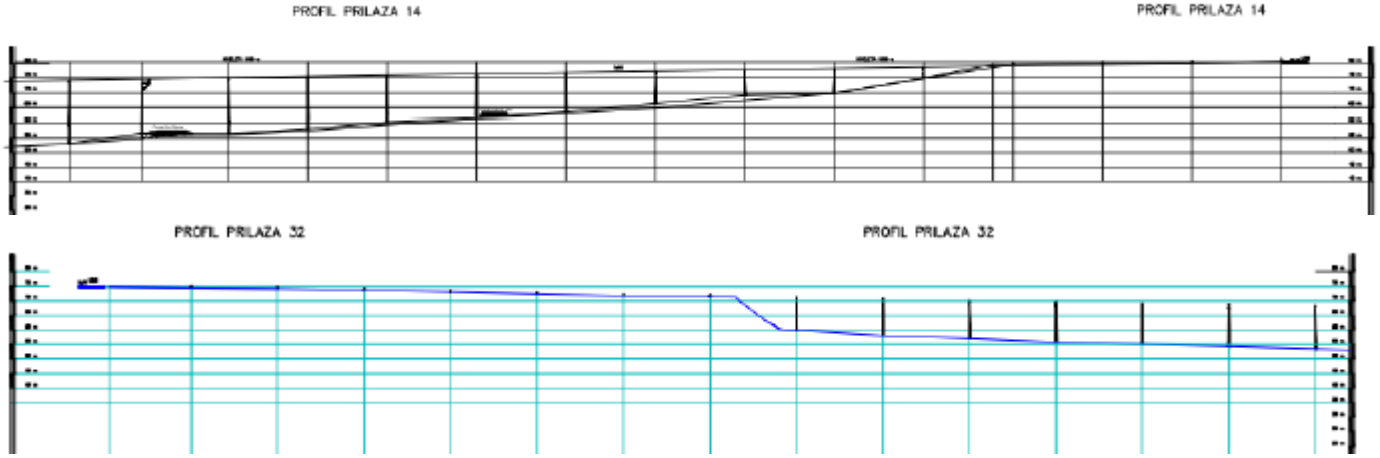
- The aerodrome operator has undertaken the safety assessment and shorten the RWY declared distances **(to meet CS)**
- The aerodrome could purchase the necessary land to extend the RESA to fulfill the CS requirement **(DAAD until this is the case)**
- After a safety assessment the aerodrome operator could decide to install an EMAS arresting system **(ELOS)**

Example 1: RESA

Example 1: RESA

Situation:

- The airport was built in 1970, RWY 2500 x 45 m, CAT I
- Aerodrome does not comply with the CS requirement of the length of RESA on both THR 14 & 32 due to the local road and topographical conditions
- RESA requirements THR 14: 15 m height difference, 300000 m^3 material
- RESA requirements THR 32: 18 m height difference, 200000 m3 material



Example 1: RESA

Situation:

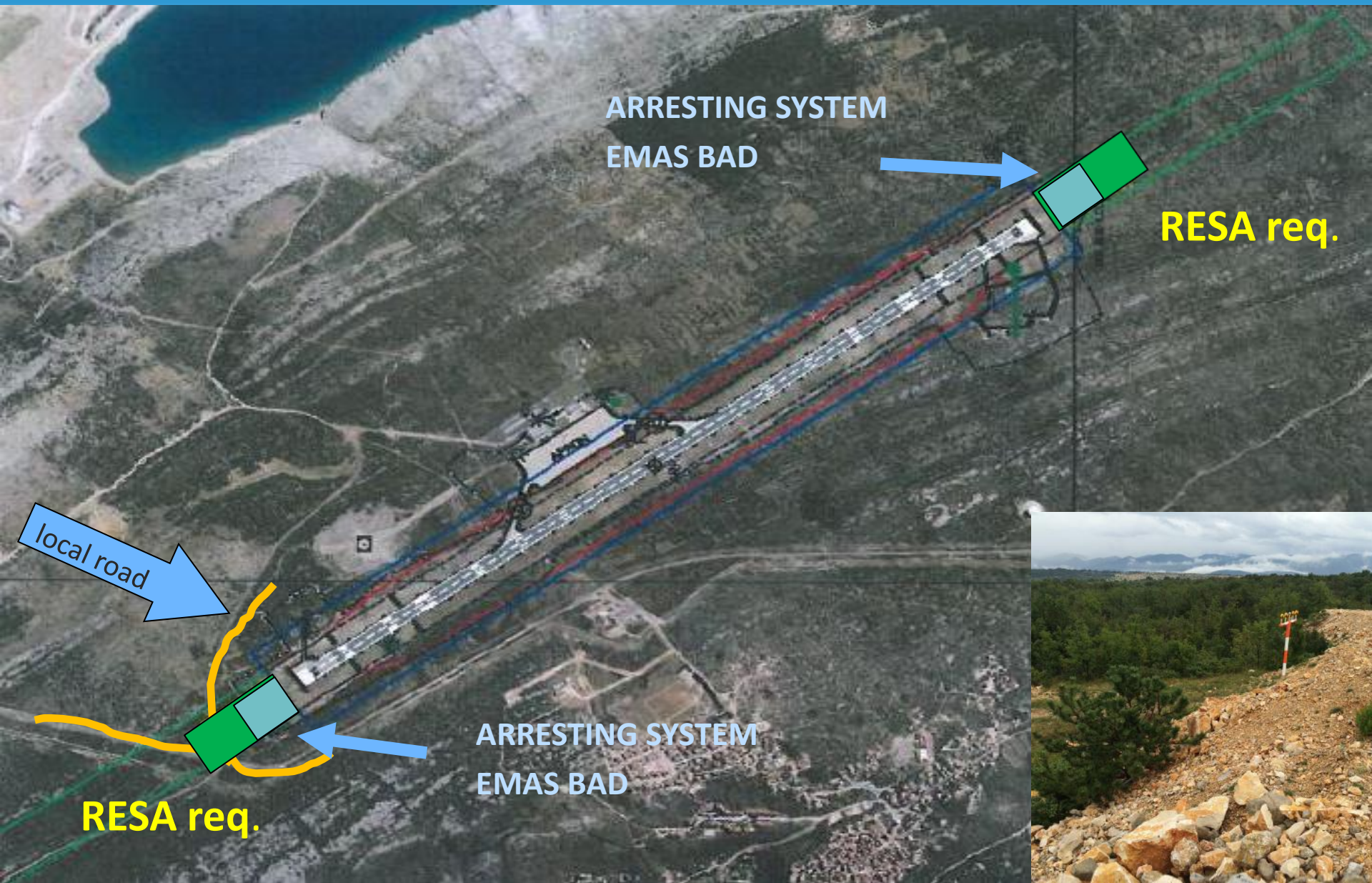
- Aerodrome does not comply with the CS requirement of the length of RESA on both THR 14 & 32 due to the local road and topographical conditions

Solution:

- The aerodrome operator has undertaken the safety assessment and shorten the RWY declared distances **(to meet CS)**
- After a safety assessment the aerodrome operator could decide to install an EMAS arresting system **(ELOS)**
- **DAAD?**

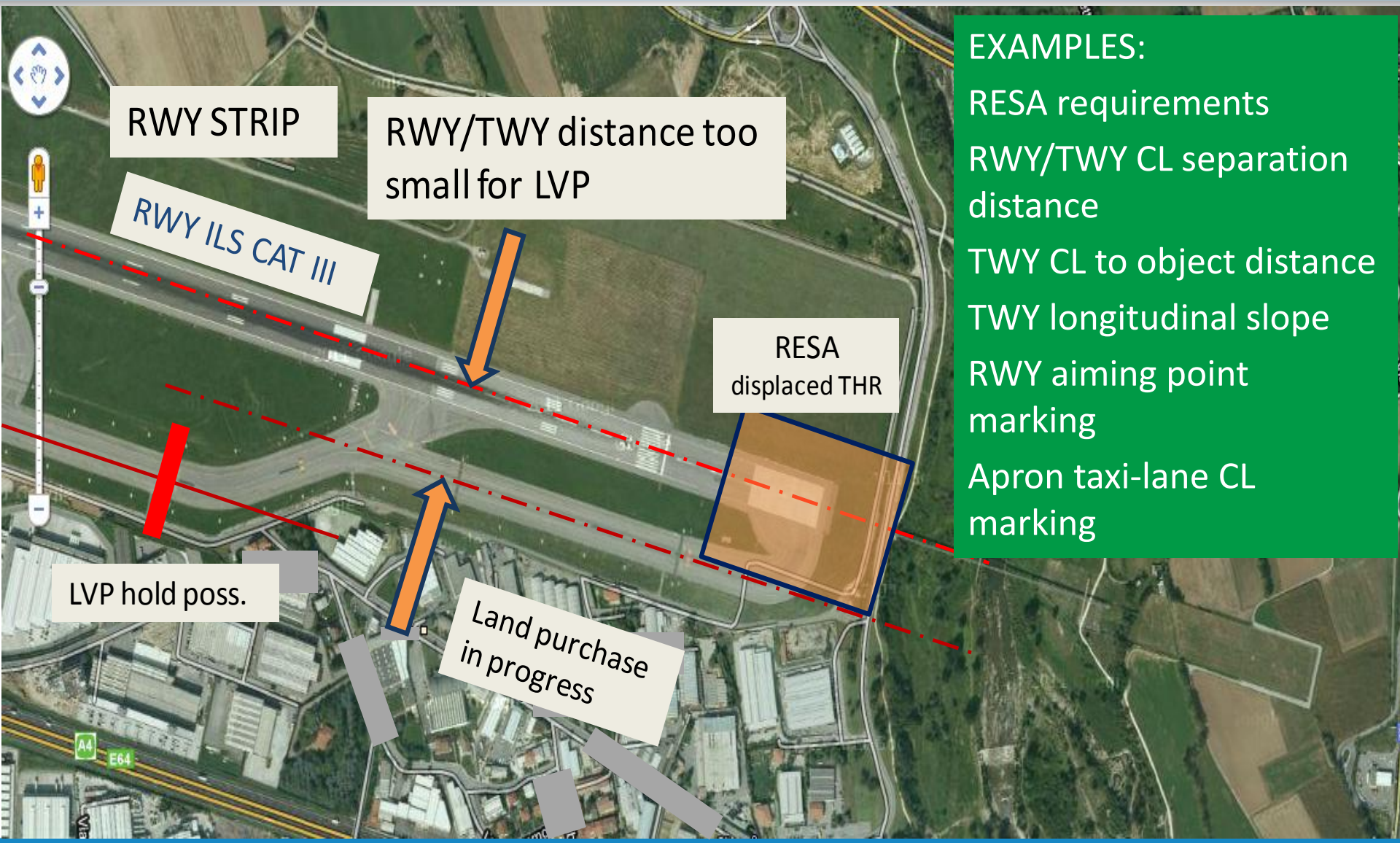


Example 1: RESA



good reason for establishing RESA

Assessment of deviations



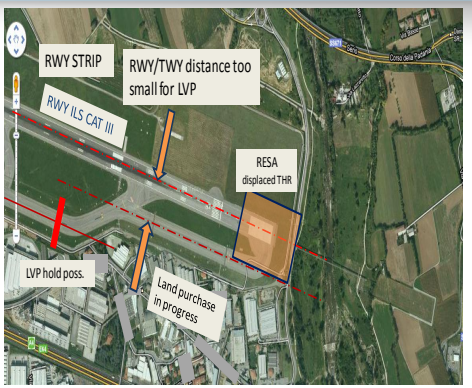
EXAMPLES:

- RESA requirements
- RWY/TWY CL separation distance
- TWY CL to object distance
- TWY longitudinal slope
- RWY aiming point marking
- Apron taxi-lane CL marking

Example 2: RWY/TWY centre line distance

Situation:

- Aerodrome is certified for operations in CAT II/III conditions
- The aerodrome does not comply with the required CS regarding the RWY/TWY separation distance
- TWY C is safe to operate in visual conditions



2 different possibilities of handling the deviation:

- CAT II/III holding position is installed on taxiway A which has the required RWY/TWY centre line distance & operational restrictions for TWY C are in place during LVPs **(Special Condition)**
- The aerodrome is in the process of purchasing the land necessary to remove the taxiway C at the required distance from the RWY **(DAAD & to meet the CS in future)**

Example 3: TWY to object distance

Example 3: TWY to object distance

Worst case scenario

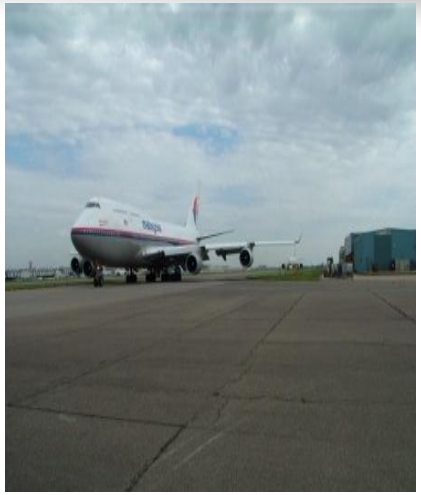
Example 3: TWY to object distance

The even worse scenario !

Example 3: TWY to object distance

Situation:

- The ADR does not comply with the required CS for the Taxiway CL to object clearance
- Taxiway S at this aerodrome has an infringement of the Code E TWY/Object by 1.5
- Infringement is on a straight portion of taxiway



Solutions:

- Aerodrome has assessed the safety concern
- Future development in the area would provide the opportunity to meet the CS and the required TWY CL to object distance
  (DAAD, with long-term duration by the CAA)
- AIP advises pilots to take extra care while taxiing past the infringement
  (safety measure as condition accompanying the DAAD)

Example 4: TWY longitudinal slope

Example 4: TWY longitudinal slope

Example 4: TWY longitudinal slope

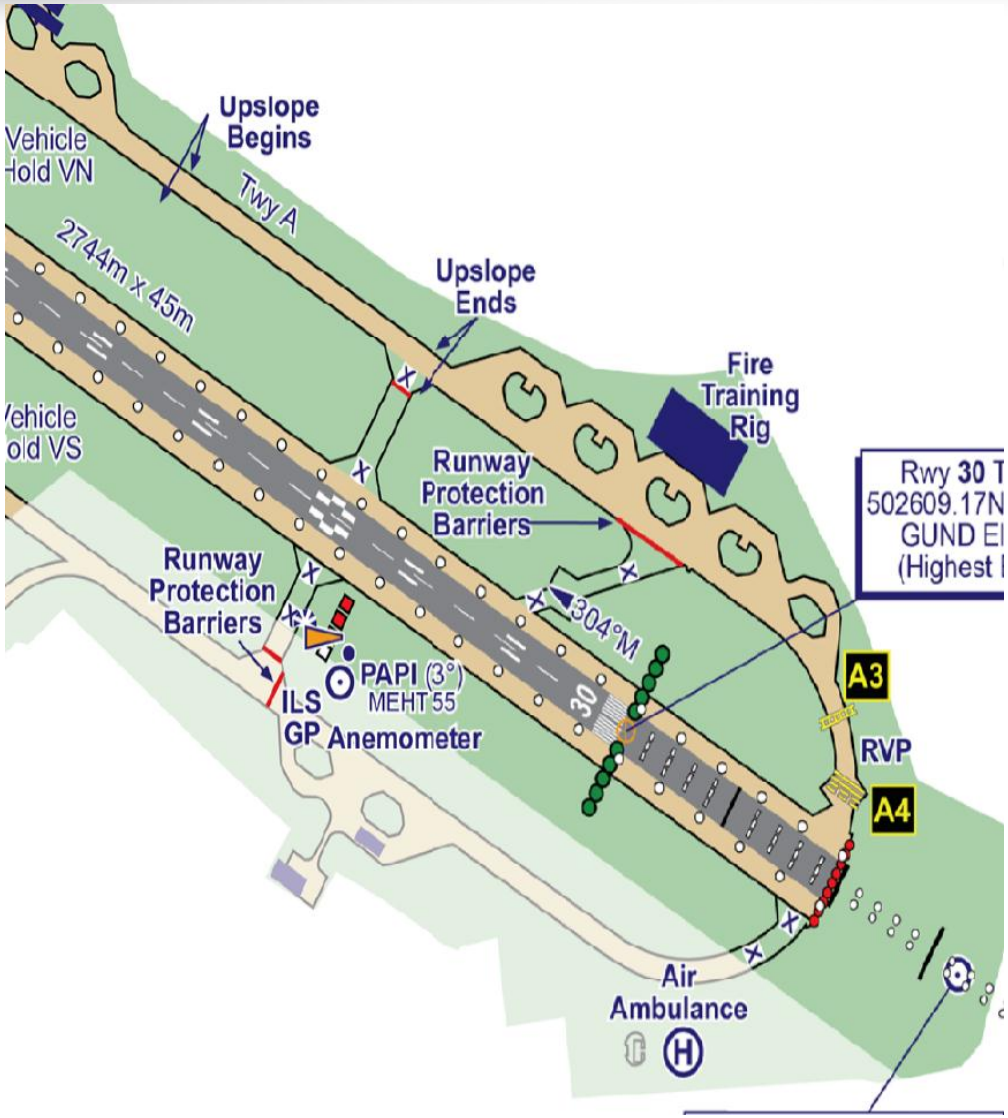
Situation:

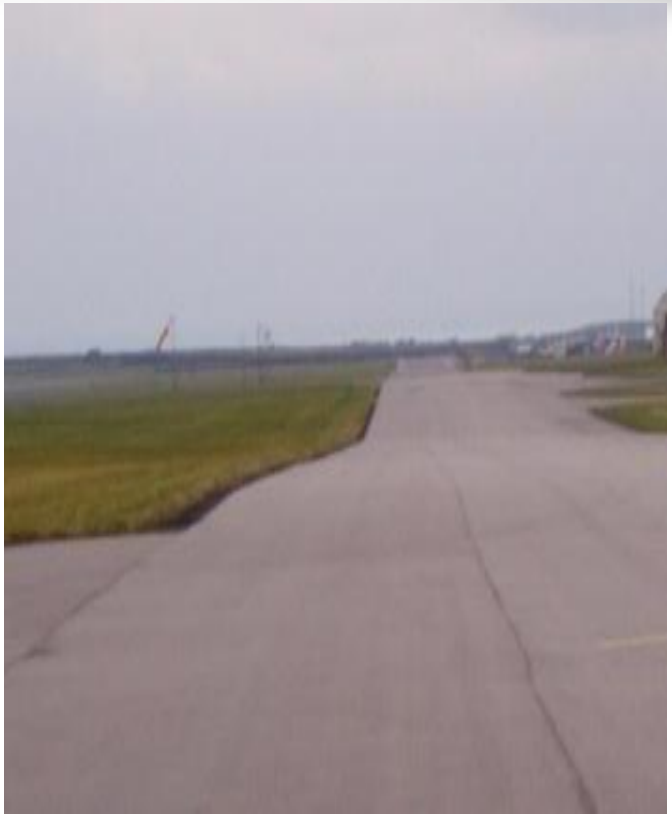
- Aerodrome Reference Code 4E. Single Parallel Taxiway.
- Taxiway 'A' has a longitudinal slope of 1.7%
- Aerodrome does not comply with the required CS, should be 1.5%
- To meet the required longitudinal slope would incur substantial cost.

Solutions:

- Aerodrome assess the situation;
- Aerodrome has developed procedures in the ADR manual to
  - Increase de-icing operation during winter conditions
  - Increase inspections in icing conditions, in case of need closure of a portion of taxiway
- Installation of new warning sigs at that portion of the TWY
- Annual review of the situation
- AIP advises pilots to take extra care **(all Special conditions)**

Example 4: TWY longitudinal slope





Southampton handled 1,722,758 passengers during 2013, a 1.7% increase compared with 2012, making it the 18th busiest airport in the UK

Example 4: TWY longitudinal slope

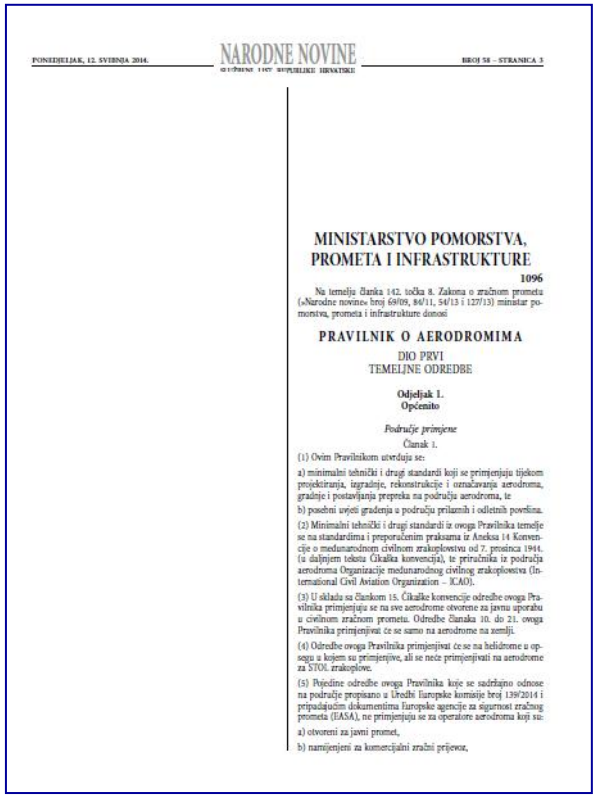
probably wouldn't be allowed in the case of exceeding longitudinal slope

Example: RWY longitudinal slope

Example: RWY longitudinal slope

Regulatory status:

- Aerodrome Regulation (Pravilnik o aerodromima, NN 58/14)
- Commission Regulation (EU) 139/2014
- ICAO Annex 14, Volume I – Aerodromes, July 2013



PONEDJELJAK, 12. SVIBNJA 2014. NARODNE NOVINE BROJ 58 – STRANICA 3

MINISTARSTVO POMORSTVA, PROMETA I INFRASTRUKTURE

1096

Na temelju članka 142. točka 8. Zakona o zračnom prometu («Narodne novine» broj 69/09, 84/11, 54/13 i 127/13) ministar pomorstva, prometa i infrastrukture donosi

PRAVILNIK O AERODROMIMA

DIO PRVI
TEMELJNE ODREDBE

Odjeljak 1.
Općenito

Područje primjene

Članak 1.

(1) Ovim Pravilnikom utvrđuju se:

a) minimalni tehnički i drugi standardi koji se primjenjuju tijekom projektiranja, izgradnje, rekonstrukcije i označavanja aerodroma, gradnje i postavljanja prepreka na području aerodroma, te

b) posebni uvjeti građenja u području prilaznih i odletnih površina.

(2) Minimalni tehnički i drugi standardi iz ovoga Pravilnika temelje se na standardima i preporučenim praksama iz Aneksa 14 Konvencije o međunarodnom civilnom zrakoplovstvu od 7. prosinca 1944. (u daljnjem tekstu: Čikaška konvencija), te priručnika iz područja aerodroma Organizacije međunarodnog civilnog zrakoplovstva (International Civil Aviation Organization – ICAO).

(3) U skladu sa člankom 15. Čikaške konvencije odredbe ovoga Pravilnika primjenjuju se na sve aerodrome otvorene za javnu uporabu u civilnom zračnom prometu. Odredbe članaka 10. do 21. ovoga Pravilnika primjenjivat će se samo na aerodrome na zemlji.

(4) Odredbe ovoga Pravilnika primjenjivat će se na helidrome u opsegu u kojem su primjenjive, ali se neće primjenjivati na aerodrome za STOL zrakoplove.

(5) Pojedine odredbe ovoga Pravilnika koje se sadržajno odnose na područje propisano u Uredbi Europske komisije broj 139/2014 i pripadajućim dokumentima Europske agencije za sigurnost zračnog prometa (EASA), ne primjenjuju se za operatore aerodroma koji su:

a) otvoreni za javni promet,

b) namijenjeni za komercijalni zračni prijevoz,

14.2.2014 EN Official Journal of the European Union L 44/1

II

(Non-legislative acts)

REGULATIONS

COMMISSION REGULATION (EU) No 139/2014
of 12 February 2014
laying down requirements and administrative procedures related to aerodromes pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council
(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (1), amended by Regulation (EC) No 1108/2009 (2), and in particular Article 8a(5) thereof,

Whereas:

(1) Regulation (EC) No 216/2008 aims at establishing and maintaining a high uniform level of civil aviation safety in Europe.

(2) The implementation of Regulation (EC) No 216/2008 requires the establishment of detailed Implementing Rules, in particular concerning the safety regulation of aerodromes, in order to maintain a high uniform level of civil aviation safety in the Union while pursuing the objective of an overall improvement in aerodrome safety.

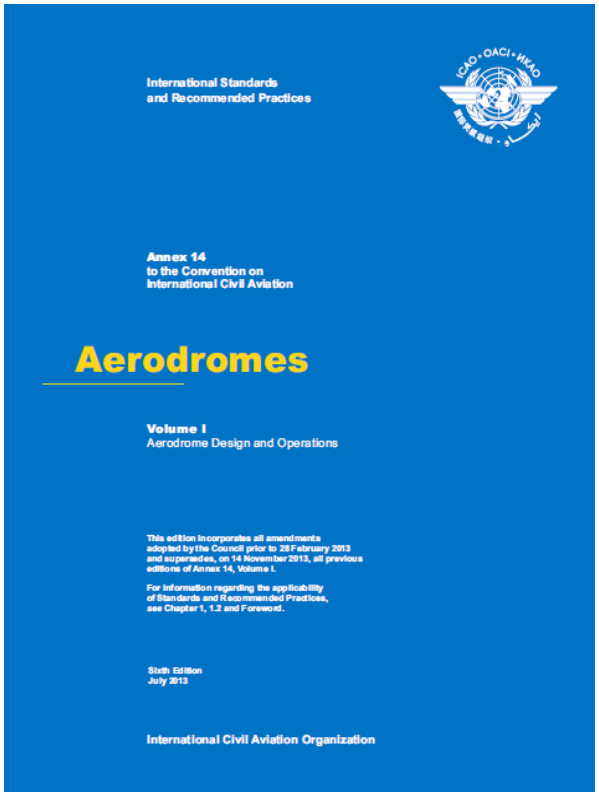
(3) It requires the Commission to adopt the necessary Implementing Rules for establishing the conditions for the design and safe operation of aerodromes referred to in Article 8a(5) before 31 December 2013.

(4) In order to ensure a smooth transition and a high level of civil aviation safety in the Union, the Implementing Rules should reflect the state of the art and the best practices in the field of aerodromes; take into account the applicable International Civil Aviation Organization (hereinafter referred to as 'ICAO') Standards and Recommended Practices, thereby respecting ICAO's respective classification throughout the system of rules; and worldwide aerodrome operation experience, and scientific and technical progress in the field of aerodromes; be proportionate to the size, traffic, category and complexity of the aerodrome and nature and volume of operations thereon; provide for the necessary flexibility for customised compliance; and cater for the cases of aerodrome infrastructure which has been developed, prior to the entry into force of this Regulation, in accordance with the different requirements contained in the national legislations of the Member States.

(5) It is necessary to provide sufficient time for the aerodrome industry and Member States administrations to adapt to the new regulatory framework and to verify the continued validity of certificates issued before the entry into force of this Regulation.

(6) With a view to ensuring uniformity in the application of common requirements, it is essential that common standards be applied by the Competent Authorities and, where applicable, the European Aviation Safety Agency (the Agency) when assessing compliance with these requirements; the Agency should develop Acceptable Means of Compliance and Guidance Material to facilitate the necessary regulatory uniformity. The common requirements should cater for identical processes within the competent authorities across the different aviation

(1) OJ L 79, 13.3.2008, p. 1.
(2) OJ L 309, 24.11.2009, p. 51.



International Standards and Recommended Practices

ICAO • OACI • ИКАО

Annex 14 to the Convention on International Civil Aviation

Aerodromes

Volume I
Aerodrome Design and Operations

This edition incorporates all amendments adopted by the Council prior to 28 February 2013 and supersedes, on 14 November 2013, all previous editions of Annex 14, Volume I.

For information regarding the applicability of Standards and Recommended Practices, see Chapter 1, 1.2 and Foreword.

Sixth Edition
July 2013

International Civil Aviation Organization

Example: RWY longitudinal slope

Aerodrome Regulation (Pravilnik o aerodromima, NN 58/14)

Članak 28.

(1) Najveći dozvoljeni uzdužni nagib uzletno-sletne staze definiran je kao razlika između najviše i najniže točke na uzdužnoj središnjoj osi uzletno-sletne staze i ne smije biti veći od sljedećih vrijednosti:

Kodni broj uzletno-sletne staze	Najveći dozvoljeni uzdužni nagib uzletno-sletne staze
1	2%
2	2%
3*	1%
4*	1%

* – za prvu i posljednju četvrtinu uzletno-sletne staze kodnog broja 3, opremljene za instrumentalni precizni pristup kategorije II i III, uzdužni nagib ne smije biti veći od 0,8 %.

* – za prvu i posljednju četvrtinu uzletno-sletne staze kodnog broja 4, uzdužni nagib ne smije biti veći od 0,8 %.

(2) U slučaju kada uzdužni nagib nije jednak cijelom duljinom uzdužne osi uzletno-sletne staze, najveća dopuštena razlika između dva uzastopna uzdužna nagiba iznosi kako slijedi:

Kodni broj uzletno-sletne staze	Najveća dopuštena razlika između dva uzastopna uzdužna nagiba uzletno-sletne staze
1	2%
2	2%
3	1,5%
4	1,5%

(3) U slučaju iz stavka 2. ovoga članka, prijelaz sa jednog uzdužnog nagiba na drugi uzdužni nagib bit će izveden primjenom zakrivljene površine, na način kako slijedi:

Kodni broj uzletno-sletne staze	Učestalost promjene	Najmanji radijus zakrivljenosti
1	0,4% po 30 m	7.500 m
2	0,4% po 30 m	7.500 m
3	0,2% po 30 m	15.000 m
4	0,1% po 30 m	30.000 m

(4) U slučaju iz stavaka 2. i 3. ovoga članka, uzdužni nagibi bit će izvedeni na način da se bez bilo kakvih smetnji može vidjeti:

a) svaka točka položena 3 m iznad uzletno-sletne staze, promatrana sa bilo koje točke položene 3 m iznad uzletno-sletne staze, na najmanjoj udaljenosti jednakoj polovici duljine uzletno-sletne staze kodnog slova C, D, E i F,

b) svaka točka položena 2 m iznad uzletno-sletne staze, promatrana sa bilo koje točke položene 2 m iznad uzletno-sletne staze, na najmanjoj udaljenosti jednakoj polovici duljine uzletno-sletne staze kodnog slova B, te

c) svaka točka položena 1,5 m iznad uzletno-sletne staze, promatrana sa bilo koje točke položene 1,5 m iznad uzletno-sletne staze, na najmanjoj udaljenosti jednakoj polovici duljine uzletno-sletne staze kodnog slova A.

(5) U slučaju kada ne postoji staza za vožnju paralelna sa uzletno-sletnom stazom cijelom duljinom uzletno-sletne staze, operator aerodroma osigurati će nesmetanu vidljivost (svake točke promatrane sa svake točke) cijelom duljinom uzletno-sletne staze.

(6) U slučaju kada se projektira i grade uzletno-sletne staze koje se međusobno sijeku, u cilju maksimalne operativne sigurnosti operator aerodroma će primijeniti dodatne kriterije u svezi maksimalne raspoložive duljine vidljivosti u području križanja, opisane u ICAO Priručniku za projektiranje aerodroma (*Doc 9157*), dio I.

(7) U slučaju iz stavaka 2., 3. i 4. ovoga članka, na uzletno-sletnoj stazi nisu dozvoljene uzdužne ili zastne promjene u uzdužnim nagibima postavljenima blizu jedan drugom. U skladu sa tim, najmanja udaljenost između točaka presijecanja dviju uzastopnih krivulja uzdužnih nagiba bit će:

a) 45 m ili,

b) ako je dobivena vrijednost veća od 45 m, jednaka onoj apsolutnih brojčanih vrijednosti uzastopnih promjena nagiba, pomnoženoj s odgovarajućom vrijednosti na način kako slijedi:

Kodni broj uzletno-sletne staze	Vrijednost sa kojom treba pomnožiti zbroj apsolutnih brojčanih vrijednosti uzastopnih promjena nagiba
1	5.000 m
2	5.000 m
3	15.000 m
4	30.000 m

PRILOG A

4. Nagibi na uzletno-sletnoj stazi

4.1. Udaljenost između promjena nagiba

Sljedeći primjer prikazuje kako se udaljenost između promjena nagiba utvrđuje (vidi sliku A-2.):

D za uzletno-sletnu stazu gdje je kod 3 treba iznositi barem:

$15\,000\ (|x - y| + |y - z|)$ m

gdje je $|x - y|$ apsolutna numerička vrijednost $x - y$

gdje je $|y - z|$ apsolutna numerička vrijednost $y - z$

Ako pretpostavimo $x = +0.01$

$y = -0.005$

$z = +0.005$

tada $|x - y| = 0.015$

$|y - z| = 0.01$

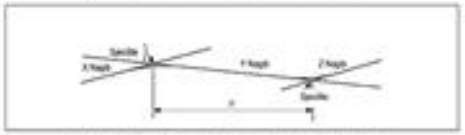
Kako bi se udovoljilo specifikacijama, D treba iznositi barem:

$15\,000\ (0.015 + 0.01)$ m,

to jest, $15\,000 \times 0.025 = 375$ m

4.2. Razmatranje uzdužnih i poprečnih nagiba

Kada se planira uzletno-sletna staza koja će kombinirati krajnje vrijednosti nagiba i promjene u nagibu dozvoljene na temelju dijela 3. ovoga Pravilnika potrebno je provesti aeronautičku studiju kako bi se osiguralo da rezultirajući profil površine ne ometa operacije zrakoplova.



Slika A-2. Profil na središnjoj crti uzletno-sletne staze

Example: RWY longitudinal slope

Commission Regulation (EU) 139/2014

CS ADR-DSN.B.060 Longitudinal slopes of runways

(a) The safety objective of limiting the longitudinal runway slope is to enable stabilized and safe use of runway by an aircraft.

(b) The slope computed by dividing the difference between the maximum and minimum elevation along the runway centre line by the runway lenght should not exceed:

(1) 1% where the code number is 3 or 4; and

(2) 2% where the code number is 1 or 2

(c) Along no portion of a runway should the longitudinal slope exceed:

(1) 1.25% where the code number is 4, except that for the first and last quarter of the lenght of the runway where the longitudinal slope should not exceed 0.8%;

(2) 1.5% where the code number is 3, except that for the first and last quarter of the lenght of a precision approach runway category II or III where the longitudinal slope should not exceed 0.8%; and

(3) 2% where the code number is 1 or 2.

GM1 ADR-DSN.B.060 Longitudinal slopes on runway

The slopes on a runway are intended to prevent the accumulation of water (or possible fluid contaminant) on the surface and to facilitate rapid drainage of surface water (or possible fluid contaminant). The water (or possible fluid contaminant) evacuation is facilitated by an adequate combination between longitudinal and transverse slopes, and may also be assisted by grooving the runway surface. Slopes should be so designed as to minimise impact on aircraft and so not to hamper the operation of aircraft. For precision approach runways, slopes in a specified area from the runway end, and including the touchdown area, should be designed so that they should correspond to the characteristics needed for such type of approach.

CS ADR-DSN.B.065 Longitudinal slope changes on runways

(a) The safety objective of limiting the longitudinal runway slope is to avoid damage of aircraft and to enable safe use of runway by an aircraft.

(b) Where slope changes cannot be avoided, a slope change between two consecutive slopes shoud not exceed:

(1) 1.5% where code number is 3 or 4; and

(2) 2% where code number is 1 or 2.

(c) The transition from one slope to another should be accomplished by a curved surface with a rate of change not exceeding:

(1) 0.1% per 30 m (minimum radius of curvature of 30 000 m) where the code number is 4;

(2) 0.2% per 30 m (minimum radius of curvature of 15 000 m) where the code number is 3; and

(3) 0.4% per 30 m (minimum radius of curvature of 7 500 m) where the code number is 1 or 2.

Example: RWY longitudinal slope

Commission Regulation (EU) 139/2014

GM1 ADR-DSN.B.065 Longitudinal slope changes on runways

(a) Slope changes are so designed as to reduce dynamic loads on the undercarriage system of the aeroplane. Minimising slope changes is especially important on runways where aircraft move at high speeds.

(b) For precision approach runways, slopes in a specified area from the runway end, and including the touchdown area, are so designed that they should correspond to the characteristics needed for such type of approach.

CS ADR-DSN.B.070 Sight distance for slopes on runways

(a) The safety objective of minimum runway sight distance values is to achieve the necessary visibility to enable safe use of runway by an aircraft.

(b) Where slope changes on runways cannot be avoided, they should be such that there should be an unobstructed line of sight from:

(1) any point 3 m above a runway to all other points 3 m above the runway within a distance of at least half the length of the runway where code letter is C, D, E, or F;

(2) any point 2 m above a runway to all other points 2 m above the runway within a distance of at least half the length of the runway where code letter is B;

(3) any point 1.5 m above a runway to all other points 1.5 m above the runway within a distance of at least half the length of the runway where code letter is A.

GM1 ADR-DSN.B.070 Sight distance

Runway longitudinal slopes and slopes changes are so designed that the pilot in the aircraft has an unobstructed line of sight over all or as much of the runway as possible, thereby enabling him to see aircraft or vehicles on the runway, and to be able to manoeuvre and take avoiding action.

CS ADR-DSN.B.075 Distance between slope changes on runways

Undulations or appreciable changes in slopes located close together along a runway should be avoided. The distance between the points of intersections of two succesive curves should not be less than:

(a) the sum of the absolute numerical values of the corresponding slope changes mustiplied by the appropriate values as follows:

(1) 30 000 m where the code number is 4;

(2) 15 000 m where the code number is 3; and

(3) 5 000 m where the code number is 1 or 2; or

(b) 45 m;

whichever is grater.

GM1 ADR-DSN.B.075 Distance between slope changes on runways

The following example illustrates how the distance between slope changes is to be determined (see Figure GM-B-2):

Example: RWY longitudinal slope

Commission Regulation (EU) 139/2014

D for a runway where the code number is 3 should be at least:

15 000 ($|x-y| + |y-z|$) m
$|x-y|$ being the absolute numerical value of $x-y$
$|y-z|$ being the absolute numerical value of $y-z$

Assuming $x = +0.01$
Assuming $y = -0.005$
Assuming $z = +0.005$

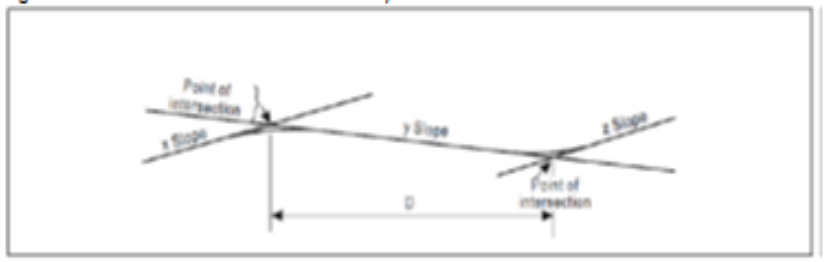
then $|x-y| = 0.015$
then $|y-z| = 0.01$

To comply with the specifications, D should be not less than:

15 000 (0.015 + 0.01) m,
that is, 15 000 × 0.025 = 375 m

When a runway is planned that should combine the extreme values for the slopes and changes in slope permitted, as prescribed in CS ADR-DSN.B.060 to CS ADR-DSN.B.080, a study should be made to ensure that the resulting surface profile should not hamper the operation of aeroplanes.

Figure GM-B-2 Profile on centre line of runway



Example: RWY longitudinal slope

ICAO Annex 14, Volume I – Aerodromes, July 2013

3.1.13 Longitudinal slopes

Recommendation.— *The slope computed by dividing the difference between the maximum and minimum elevation along the runway centre line by the runway length should not exceed:*

— *1 per cent where the code number is 3 or 4; and*

— *2 per cent where the code number is 1 or 2.*

3.1.14 **Recommendation.**— *Along no portion of a runway should the longitudinal slope exceed:*

— *1.25 per cent where the code number is 4, except that for the first and last quarter of the length of the runway the longitudinal slope should not exceed 0.8 per cent;*

— *1.5 per cent where the code number is 3, except that for the first and last quarter of the length of a precision approach runway category II or III the longitudinal slope should not exceed 0.8 per cent; and*

— *2 per cent where the code number is 1 or 2.*

3.1.15 Longitudinal slope changes

Recommendation.— *Where slope changes cannot be avoided, a slope change between two consecutive slopes should not exceed:*

— *1.5 per cent where the code number is 3 or 4; and*

— *2 per cent where the code number is 1 or 2.*

Note.— Guidance on slope changes before a runway is given in Attachment A, Section 4.

3.1.16 **Recommendation.**— *The transition from one slope to another should be accomplished by a curved surface with a rate of change not exceeding:*

— *0.1 per cent per 30 m (minimum radius of curvature of 30 000 m) where the code number is 4;*

— *0.2 per cent per 30 m (minimum radius of curvature of 15 000 m) where the code number is 3; and*

— *0.4 per cent per 30 m (minimum radius of curvature of 7 500 m) where the code number is 1 or 2.*

3.1.17 Sight distance

Recommendation.— *Where slope changes cannot be avoided, they should be such that there will be an unobstructed line of sight from:*

— *any point 3 m above a runway to all other points 3 m above the runway within a distance of at least half the length of the runway where the code letter is C, D, E or F;*

— *any point 2 m above a runway to all other points 2 m above the runway within a distance of at least half the length of the runway where the code letter is B; and*

— *any point 1.5 m above a runway to all other points 1.5 m above the runway within a distance of at least half the length of the runway where the code letter is A.*

Note.— Consideration will have to be given to providing an unobstructed line of sight over the entire length of a single runway where a full-length parallel taxiway is not available. Where an aerodrome has intersecting runways, additional criteria on the line of sight of the intersection area would need to be considered for operational safety. See the **Aerodrome Design Manual** *(Doc 9157), Part 1.*

3.1.18 Distance between slope changes

Recommendation.— *Undulations or appreciable changes in slopes located close together along a runway should be avoided. The distance between the points of intersection of two successive curves should not be less than:*

Example: RWY longitudinal slope

ICAO Annex 14, Volume I – Aerodromes, July 2013

a) the sum of the absolute numerical values of the corresponding slope changes multiplied by the appropriate value as follows:

— 30 000 m where the code number is 4;

— 15 000 m where the code number is 3; and

— 5 000 m where the code number is 1 or 2; or

b) 45 m;

whichever is greater.

Note.— Guidance on implementing this specification is given in Attachment A, Section 4.

Example: RWY longitudinal slope

Uzimajući u obzir navedeni regulatorni okvir može se zaključiti za uzdužne nagibe uzletno-sletne staze slijedeće:

- Najveći dozvoljeni uzdužni nagib USS-e je $\frac{(160{,}68-147{,}35)}{3300} = 0{,}4\% < 1\%$ (zadovoljava).
- Na niti jednom dijelu USS-e uzdužni nagib ne smije prelaziti vrijednost od 1,25% (ne zadovoljava – na stacionaži 2+200 do 2+775 nagib iznosi prosječno 1,35%); detaljnu analizu pogledati na grafičkom prilogu 1 i 2.
- U prvoj i posljednjoj četvrtini duljine USS-e uzdužni nagib ne smije prelaziti vrijednost od 0,8% (ne zadovoljava – na stacionaži 2+475 do 2+775 nagib iznosi prosječno 1,35%); detaljnu analizu pogledati na grafičkom prilogu 1 i 2.
- Najveća dopuštena razlika između dva susjedna nagiba je 1,5% (zadovoljava); detaljnu analizu pogledati na grafičkom prilogu 2.
- Prijelaz sa jednog uzdužnog nagiba na drugi uzdužni nagib bit će izveden primjenom zakrivljene površine najmanjeg radijusa 30 000 m (ne zadovoljava – na stacionaži 2+775 do 3+025 radijus zakrivljenosti je 20.000m); detaljnu analizu pogledati na grafičkom prilogu 2.
- Uzdužni nagib bit će izveden na način da se bez bilo kakvih smetnji može vidjeti svaka točka položena 3m iznad USS-e, promatrana sa bilo koje točke položene 3m iznad USS-e, na najmanjoj udaljenosti jednakoj polovici USS-e (ne zadovoljava – na stacionaži 1+500 do 2+325 kolnik zadire u linije vidljivosti najviše do 1,64m); detaljnu analizu pogledati na grafičkom prikazu 3.
- Najmanja udaljenost između točaka sjecišta dviju uzastopnih krivulja, odnosno najmanja udaljenost dvije susjedne točke promjene uzdužnog nagiba je

$$D = 30000[|\Delta i(n)| + |\Delta i(n+1)|] \text{ gdje je}$$

$|\Delta i(n)| = |x - y|$ apsolutna vrijednost promjena uzdužnog nagiba n-tog sjecišta; x i y prema objašnjenju iz pravilnika o aerodromima

$|\Delta i(n+1)| = |y - z|$ apsolutna vrijednost promjena uzdužnog nagiba (n+1)-tog sjecišta; y i z prema objašnjenju iz pravilnika o aerodromima

(zadovoljava); detaljnu analizu pogledati na grafičkom prilogu 2.

Solution:

- Topographical restrictions require Aerodrome operator to assess the situation due to aircraft performances during take-off or braking, cockpit visibility, possible disturbances of Navigation Aids, ATC procedures, needs to increase separation distances, …
- Additional information in AIP advises pilots to take extra care **(Special Conditions)**

Example 5: Aiming point marking

Example 5: Aiming point marking

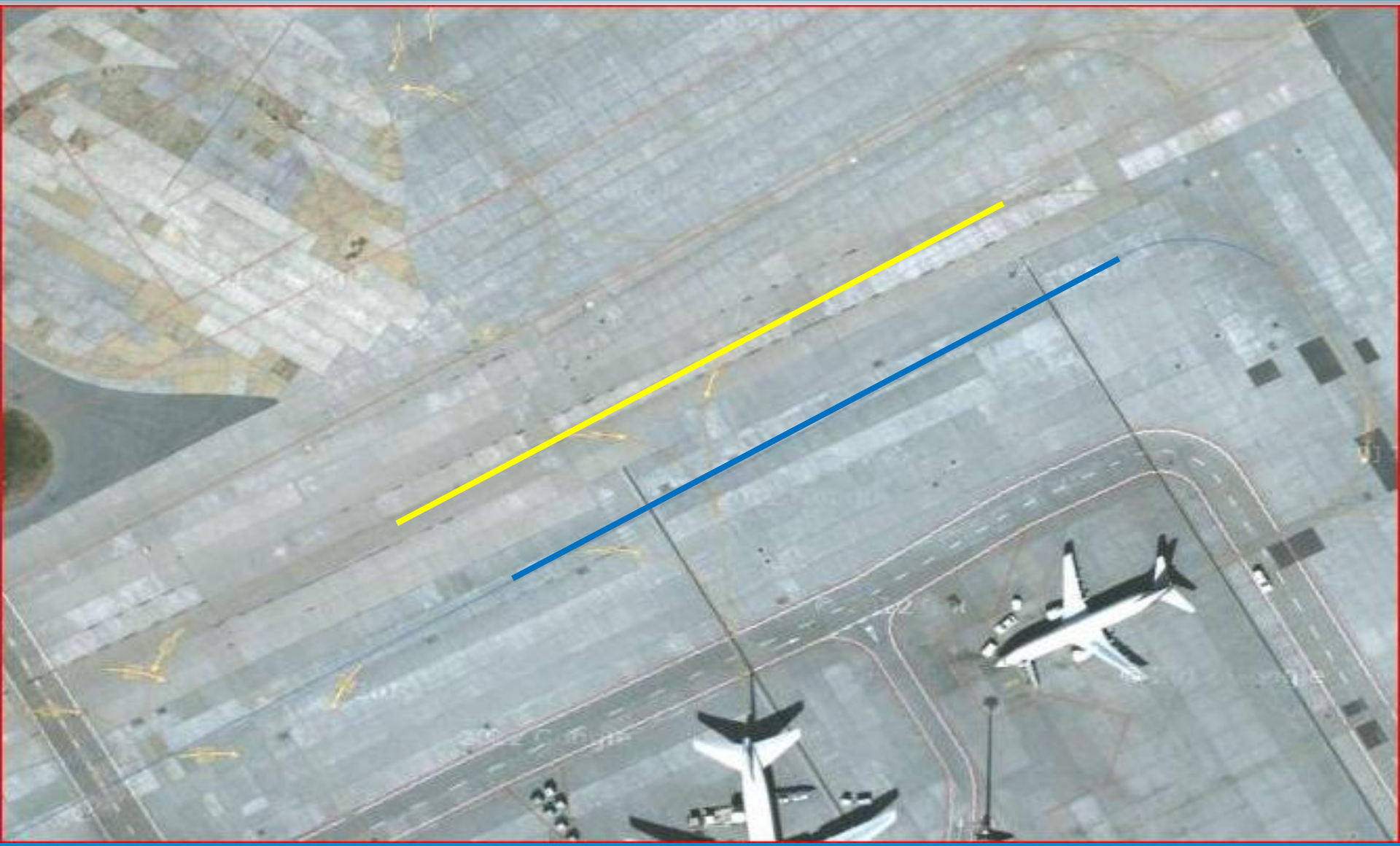
Situation:

- The Aiming point marking offers a pilot clear identification of aiming point
- The Aiming point marking at this aerodrome does not comply with the required CS (different stripes)

Solution:

- Aerodrome operator has assessed the safety concern and applied for the Aiming point marking to be recognised as **(ELOS)**
- The CAA has accepted the proposed ELOS for the Aiming point marking;
- Aiming point design is published in the AIP of the ADR.
- However: in real life UK will abandon the unusual aiming point !

Example 6: Colour of CL of apron taxilane marking



Example 6: Colour of CL of apron taxilane marking

Example 6: Colour of CL of apron taxilane marking

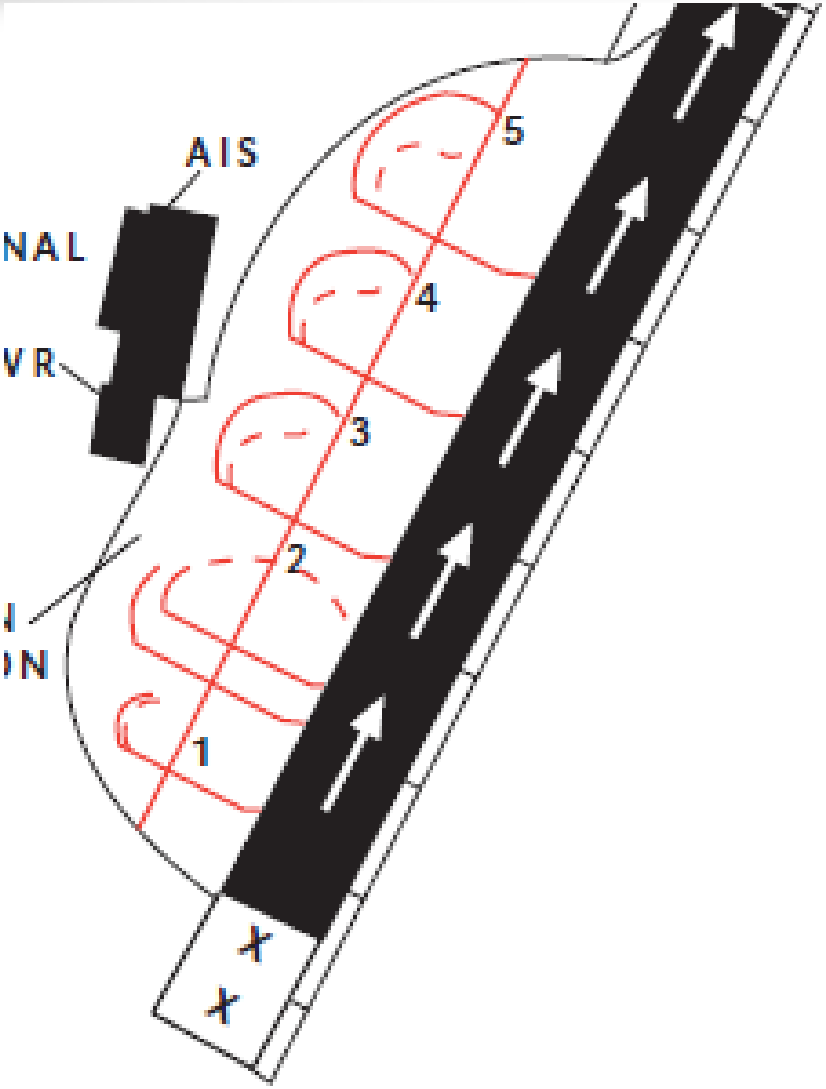
Situation:

- The colours of the CL markings of the apron taxilane does not comply with the required CS (yellow only).
- The CL marking on an apron taxilane is in the blue colour to identify TWY centrelines that could be used by different sized aircraft.

Solution:

- The aerodrome operator has undertaken the safety assessment and proposed to NAA an acceptance of this deviation.
- The information as to which aircraft is allowed to park on which positions is provided in the AIP.
  (Special Condition)

Example 6: Colour of CL of apron taxilane marking



NOTES:

ACFT ON THE GENERAL AVIATION APRON SHALL BE PARKED WEST OF THE BROKEN WHITE LINE.

PARKING OF B757/200 PERMITTED ON POSITIONS 2 & 5, B757/300 ON POSITION 2 ONLY.

B757 ACFT ON POSITIONS 2 OR 5 TAKING OFF FROM RWY 03 MUST START THEIR TAKE OFF RUN FROM THE RWY PORTION ABEAM THEIR PARKING POSITION WITHOUT BACK-TRACKING ON THE RWY.

Example 7: Width of RWY Strip reduced

Example 7: Width of RWY STRIP reduced

Situation:

- The width of the RWY strip is reduced to 134 m due to the proximity of the wood/trees
- The total RWY strip width does not comply with the CS.
- The trees and fence are penetrating the Transitional surface, i.e. represent an obstacle.

Solution:

- Aerodrome has assessed the safety concern.
- AIP ADR chart advises pilots about the situation.
- When possible the aerodrome will purchase the land to extend the strip to fulfill the CS requirement.

(DAAD accepted by CAA until this is the case)

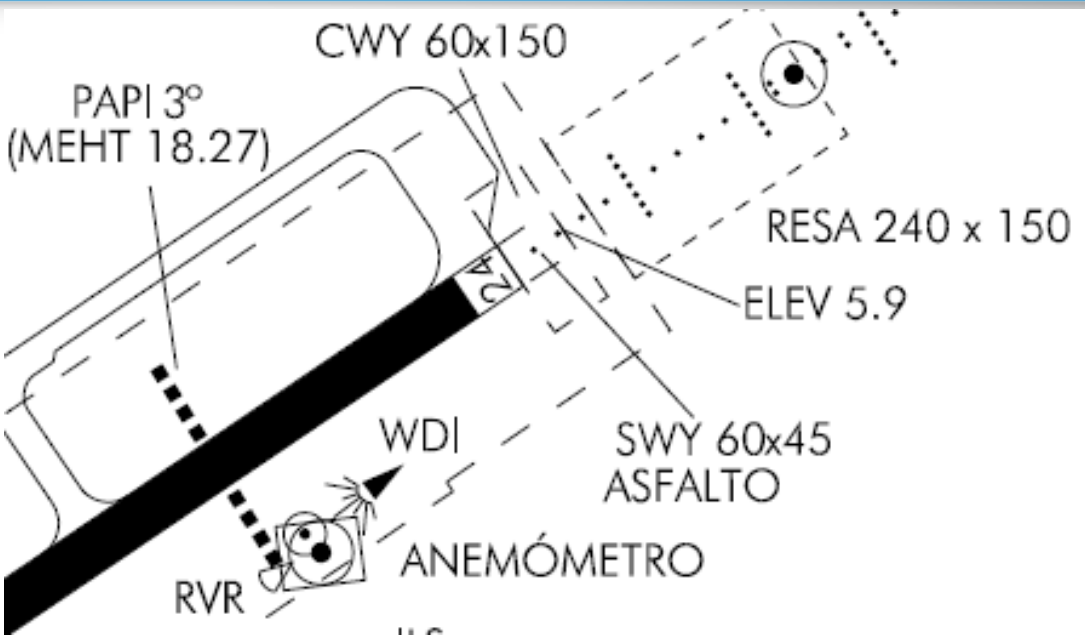
Example 7: Width of RWY STRIP reduced

Notes in the AIP aerodrome chart:

Strip: 2980x295 Note (2) (3)

(2): RWY 06 RIGHT SIDE: STRIP 145m.(instead of 150m)

(3): FINAL 253m OF RWY 06 RIGHT SIDE: STRIP DECREASES T0 134m.(instead of 150m = 16m less)



(1) PRIMEROS 104 m RWY 06 & RWY 24: HORMIGÓN HIDRÁULICO.
(2) RWY 06 MARGEN DERECHO: FRANJA 145 m.
(3) ÚLTIMOS 253 m DE RWY 06 MARGEN DERECHO: FRANJA DECRECE HASTA 134 m.

Example 8: Significant obstacle penetrates approach and take-off surface

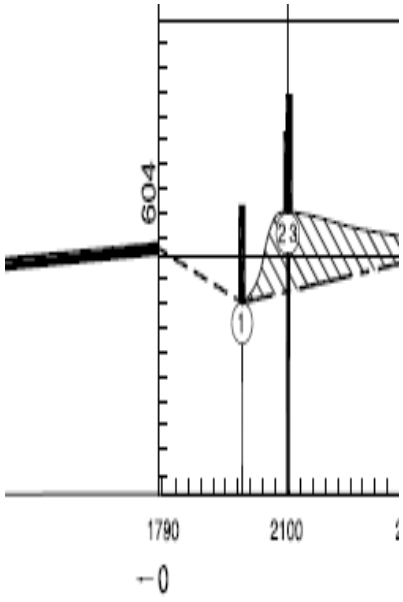
Example 8: Significant obstacle penetrates app/take-off surface

Situation:

- Significant obstacle(s) penetrates the approach and take-off surface (RWY 28)
- The characteristics of the approach and take-off surfaces don't meet the required CSs = not obstacle free

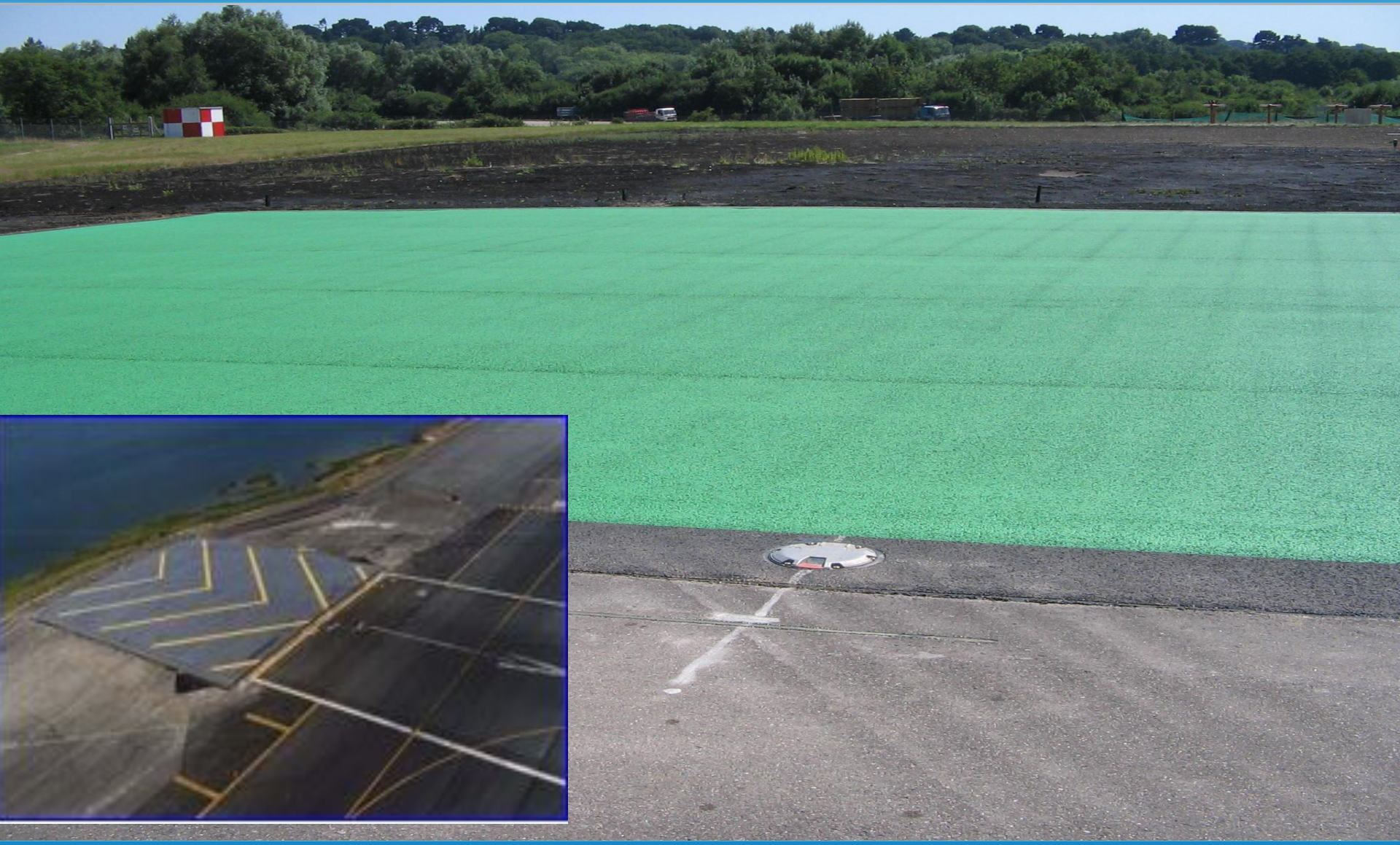
Solution:

- Aerodrome operator to undertake a safety assessment and propose to NAA an acceptance of this deviation. Possible conclusions of the SA could be:
- Option 1: no additional requirement to change the app/ take off procedure. **(DAAD, AIP obstacle Type A chart)**
- Option 2: Additional approach / take-off requirements **(DAAD, AIP Type A chart + inform on add. Procedure)**
- Option 3: significant obstacle therefore to be removed (**to be in line with CS**)



Example 9: Arresting system (EMAS)

Example 9: Arresting system (EMAS)



Example 9: Arresting system (EMAS)

Situation:

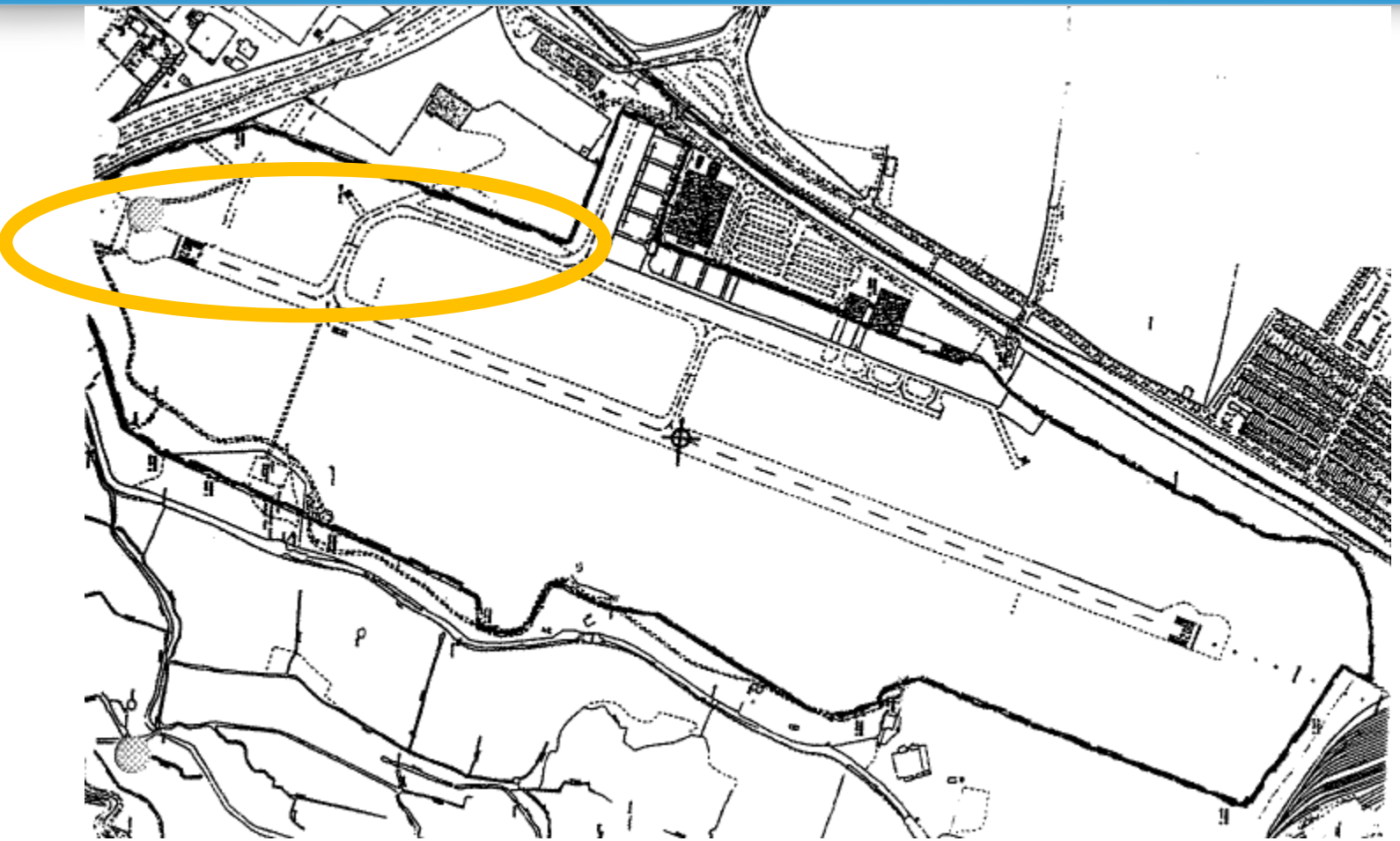
- ADR cannot met the CS of a minimum of 90m RESA due to terrain limitations (road at the end of runway 20)
- The 60m strip plus 90m RESA would require a length of 150m.

Solution:

- The Airport operator installed a soft ground arrestor bed of arrestor bed to make sure that overrun of an a/c would be stopped. **(ELOS)**
- To avoid it being taxied on it is pained green.
- There is a warning for pilots in the AIP.

Example 9: Arresting system (EMAS)

Example 9: Arresting system (EMAS)



Newquay airport handled 174 891 pax in 2013

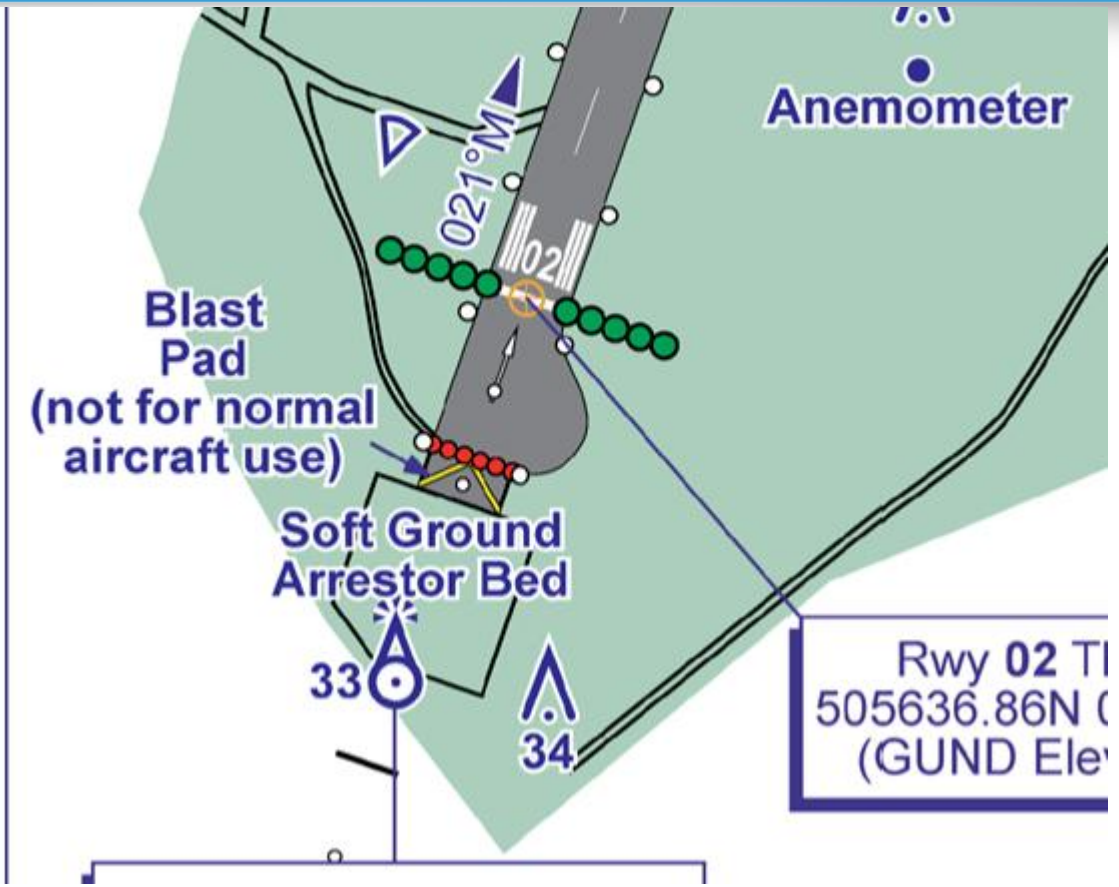
Example 9: Arresting system (EMAS)

AIP local traffic regulations

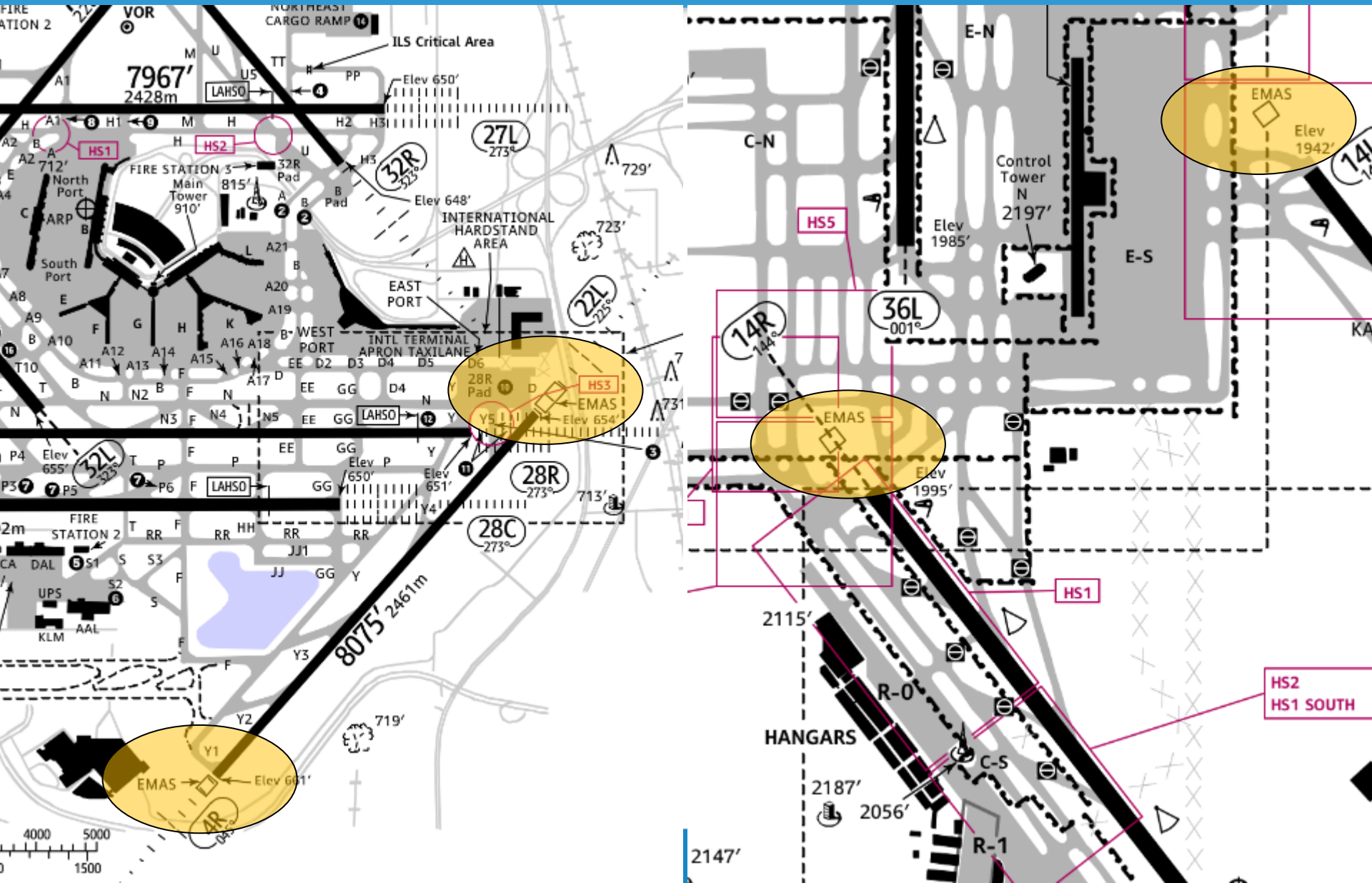
Warnings

(a) A Soft Ground Arrestor Bed is provided to stop aircraft in the event of an overrun on Runway 20. The bed, which is 73 m, is disposed symmetrically about the extended runway centre-line and is twice the runway width.
The bed starts 19.5 m

beyond the end of the paved surface.



Example 9: Arresting system (EMAS)



Example 10: Handling of potential deviations

Example 10: Handling of potential deviations

Situation:

- Without the displaced thresholds there would be deviations of the STRIP requirement on both sides of the RWY.

- Without displaced holding point there would be a RWY to TWY centre line distance deviation from the CS requirement.

- Without the displaced holding point during landings there would be impermissible penetration of the approach surface by a waiting aircraft (which starts 60m before threshold) and also would infringe the ILS protected area.

Example 11: Apron stand marking for different aircraft sizes

Example 11: Apron stand marking for different aircraft sizes

Situation:

- The apron is designed for ref. code ‘C’ aircraft. Parking position for ref. code ‘D’ aircraft doesn’t comply with the CS of the clearance distance requirements. Aircraft parking position marking is in different shape

Solution:

- The aerodrome operator has undertaken the safety assessment and proposed to NAA to accept this deviation.
- Use of parking positions no. 8 & 9 is restricted when an aircraft with the ref. code ‘D’ is on the parking position 8A.
- Additional information is given to apron services and in AIP in the aerodrome charts and in the local traffic regulations **(Special Condition)**

Example 12: TWY accommodation for large aircraft (A380)

Example 12: TWY accommodation for large aircraft (A380)

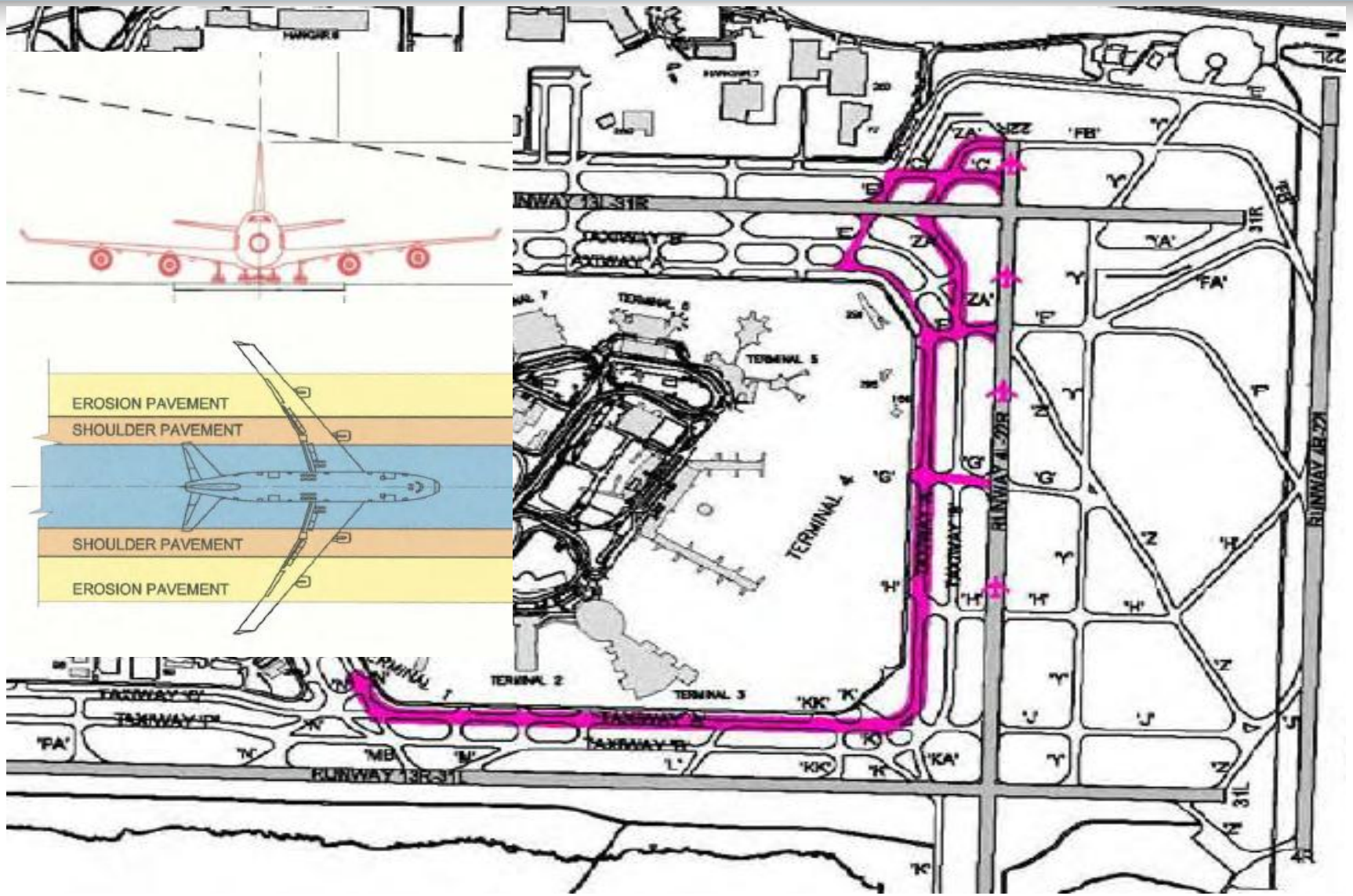
Situation:

- ADR is code ‘4E’. An airline wants to operate A380 in the future.
- Need for upgrading the width of TWY ‘A’.
- Separation distances non-compliant with CS.

Solution:

- The ADR operator undertook safety assessment for the TWY width, pavement conditions, clearance distances, engine blast conditions, transitional surface and other elements.
- ADR operator proposes to NAA to prescribe **SC** for an operational plan.
- The ‘A380 Operational Plan’ is accepted by NAA: during A380 presence: no simultaneous operations are allowed on parallel taxiways and Information on procedures to be given in AIP
- **SC given the Operational Plan + expectation to one day comply with CS**

Example 12: TWY accommodation for large aircraft (A380)



Example 13: Short runway - Starter extension

Example 13: Short runway - Starter extension

Situation:

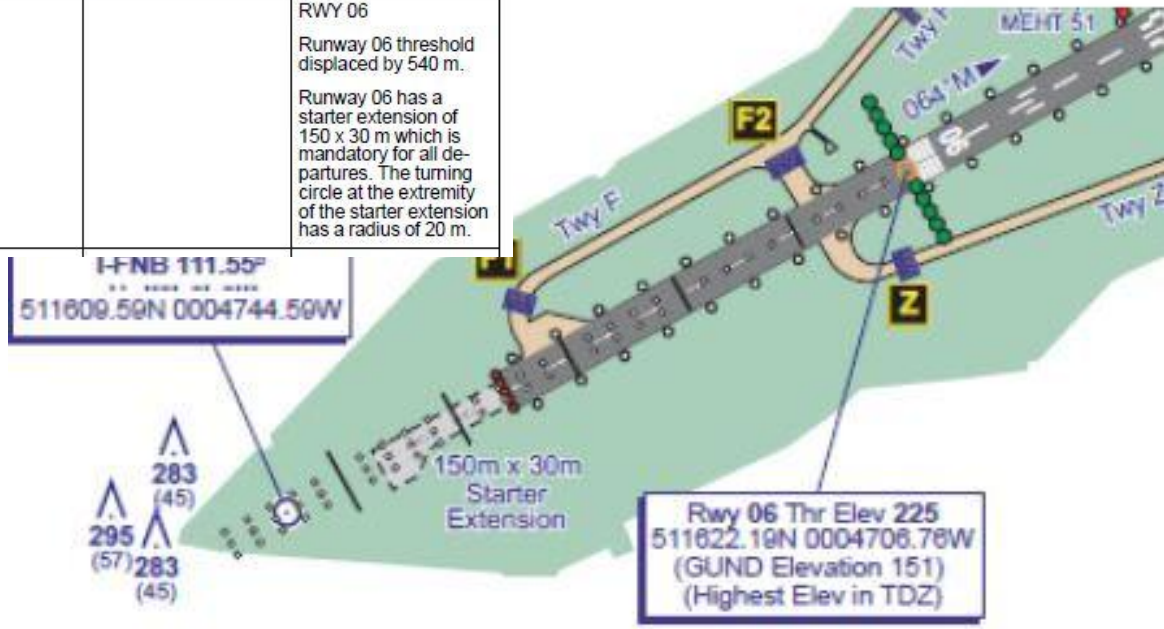
- ADR required to increase TODA to accommodate larger aircraft.
- Cannot establish clearway due to obstacle environment.
- Cannot extend runway before threshold due to land constraints (Public Road and Commercial Waterway).

Solution:

- The Airport has established a 'Starter Extension' that allows the ADR to increase TODA.
- The starter extension is a maximum of 150m length and 2/3 the width of the runway to indicate it does not have the same safeguarding as a runway (runway strip width). The reduced safeguarding can be achieved due to the slow speeds involved in the initial take-off roll.
- No increase of declared distance in the opposite direction (one-way in the direction of take-off)
- CA described this solution as SC in the CB and the ADR published it in the AIP
- Note: 'Starter Extension' solution is not (yet) predicted with EASA rules!!

Example 13: Short runway - Starter extension

Slope of RWY/ SWY	SWY dimensions	Clearway dimensions	Strip Dimensions	OFZ	Remarks
7	8	9	10	11	12
	590 x 45 m				RWY 06 Runway 06 threshold displaced by 540 m. Runway 06 has a starter extension of 150 x 30 m which is mandatory for all departures. The turning circle at the extremity of the starter extension has a radius of 20 m.



When a starter extension is provided, the runway strip surrounding the starter extension need only provide for wing overhang plus a safety margin of 7.5 m or 20% of wingspan, whichever is the greater. This distance may need to be increased for other factors, e.g. jet blast.

06	900 m Light intensity high.	HI Green with elevated wingbars	PAPI Left/3.5° 51 ft			HI bi-directional with a LI omni-directional component every 60 m	Red HI 60 m		**Approach Lighting:** HI Coded centre-line with five crossbars **PAPI dist from THR:** 308.2 m Runways 06/24 both have 600 m yellow 'caution zone' edge lighting at the upwind end Runway 06 starter extension has blue edge and end lights

Example 14: RWY & TWY Shoulders

Example 14: RWY & TWY Shoulders

CS ADR-DSN.B.125 Runway shoulders

(a) The safety objective of runway shoulder is that it should be so constructed as to mitigate any hazard to an aircraft running off the runway or stopway or to avoid the ingestion of loose stones or other objects by turbine engines

(b) Runway shoulders should be provided for a runway where the code letter is D or E, and the runway width is less than 60 m.

(c) Runway shoulders should be provided for a runway where the code letter is F.

CS ADR-DSN.D.305 Taxiway shoulders

(a) Straight portions of a taxiway where the code letter is C, D, E, or F should be provided with shoulders which extend symmetrically on each side of the taxiway so that the overall width of the taxiway and its shoulders on straight portions is not less than:

(1) 60 m where the code letter is F;

(2) 44 m where the code letter is E;

(3) 38 m where the code letter is D; and

(4) 25 m where the code letter is C.

(b) On taxiway curves and on junctions or intersections where increased pavement is provided, the shoulder width should be not less than that on the adjacent straight portions of the taxiway.

(c) When a taxiway is intended to be used by turbine-engined aeroplanes, the surface of the taxiway shoulder should be prepared so as to resist erosion and the ingestion of the surface material by aeroplane engines.

Example 14: RWY & TWY Shoulders

Example 14: RWY & TWY Shoulders

Situation:

- RWY dimensions: 2946 x 45 m, CAT I, TWY 23 m width, RWY & TWY shoulders are not provided (paved)
- Aerodrome does not comply with the CS requirement, of the RWY & TWY shoulders

Solution:

- The aerodrome operator has undertaken the mitigation measures to keep unpaved shoulders safe for operations (ADR Manual, inspections, grass coverage, sweeping, …) **(DAAD until this is the case)**

Recent ICAO developments: ICAO ADWG is requested to consider making paragraph 3.2.6: Strength of runway shoulders a Standard: 'A runway shoulder should be prepared or constructed so as to be capable, in the event of an aeroplane running off the runway, of supporting the aeroplane without inducing structural damage to the aeroplane …..'

Example 14: RWY & TWY Shoulders

Example:

Example:

The Airport, situation today:

- ICAO ARC: ‘4D’, 7/RFF
- RWY 2500 x 45 m,
- RWY 14: Non – Instrument,
- RWY 32: Non – Precision
- Apron: 7 parking psn, 6 ‘C’ and 1 ‘D’
- Aerodrome does not comply with the following CS requirements:
  - STRIP dimensions (2620 x 150 m)
  - local road infringe SRIP and RESA
  - RESA at both RWY ends
  - Take off Surface for RWY 32 / Approach Surface for RWY 14 are not obstacle free: ADR fence, local road, mobile objects
  - Approach Surface for RWY 32 / Take off Surface for RWY 14 are not obstacle free: ADR fence, local road, mobile objects
  - Transitional Surface is not obstacle free: local roads, mobile object, TWR, floodlights

Example:


Threshold 14:
· STRIP dimensions (RWY 14 NI App)
· Non frangible objects in Strip
· RESA not provided
· AD Fence
· Local road
TWY A:
· TWY A distance of obstacles
· Height of obstacles
· Location of TWY CL Marking
· AD Fence, fixed obstacles
TWR:
· TWR Height
· Distance from STRIP and RWY
Apron Floodlighting
· Location and Height
Threshold 32:
· STRIP dimensions (RWY 32 NP App)
· Non frangible objects in Strip
· RESA width and full length
· Local road
Kavači
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STRIP – EASA CS

CHAPTER B

CS ADR-DSN.B.150 Runway strip to be provided

A runway and any associated stopways should be included in a strip.

CS ADR-DSN.B.155 Length of runway strip

A strip should extend before the threshold and beyond the end of the runway or stopway for a distance of at least:

(a) 60 m where the code number is 2, 3, or 4;

(b) 60 m where the code number is 1 and the runway is an instrument one; and

(c) 30 m where the code number is 1 and the runway is a non-instrument one.

STRIP – EASA CS

CS ADR-DSN.B.160 Width of runway strip

(a) The safety objective of the runway strip is to reduce the probability of damage to an aircraft accidentally running off the runway, to protect aircraft flying over it when taking-off or landing and to enable safe use by rescue and firefighting vehicles'.

(b) A strip including a precision approach runway should extend laterally to a distance of at least:

(1) 150 m where the code number is 3 or 4; and

(2) 75 m where the code number is 1 or 2; on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

(c) A strip including a non-precision approach runway should extend laterally to a distance of at least:

(1) 150 m where the code number is 3 or 4; and

(2) 75 m where the code number is 1 or 2;

on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

(d) A strip including a non-instrument runway should extend on each side of the centre line of the runway and its extended centre line throughout the length of the strip, to a distance of at least:

(1) 75 m where the code number is 3 or 4;

(2) 40 m where the code number is 2; and

(3) 30 m where the code number is 1.

STRIP – EASA CS

CS ADR-DSN.B.165 Objects on runway strips

(a) An object situated on a runway strip which may endanger aeroplanes should be regarded as an obstacle and should, as far as practicable, be removed.

(b) No fixed object, other than visual aids required for air navigation or for aircraft safety purposes and satisfying the relevant frangibility requirement in Chapter T, should be permitted on a runway strip:

(1) within 77.5 m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or

(2) within 60 m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4;or

(3) within 45 m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.

(c) To eliminate a buried vertical surface, a slope should be provided which extends from the top of the construction to not less than 0.3 m below ground level. The slope should be no greater than 1:10.

(d) No mobile object should be permitted on this part of the runway strip during the use of the runway for landing or take-off.

CHAPTER B

CS ADR-DSN.T.915 Siting of equipment and installations on operational areas

RESA – EASA CS

ADR CS

CS ADR-DSN.C.210 Runway End Safety Areas

(a) The safety objective of the runway end safety area (RESA) is to minimise risks to aircraft and their occupants when an aeroplane overruns or undershoots a runway.

(b) A runway end safety area should be provided at each end of a runway strip where:

(1) the code number is 3 or 4; and

(2) the code number is 1 or 2 and the runway is an instrument one.

ADR CS

CS ADR-DSN.C.215 Dimensions of runway end safety areas

(a) Length of RESA

A runway end safety area should extend from the end of a runway strip to a distance of at least 90 m and, as far as practicable, extend to a distance of:

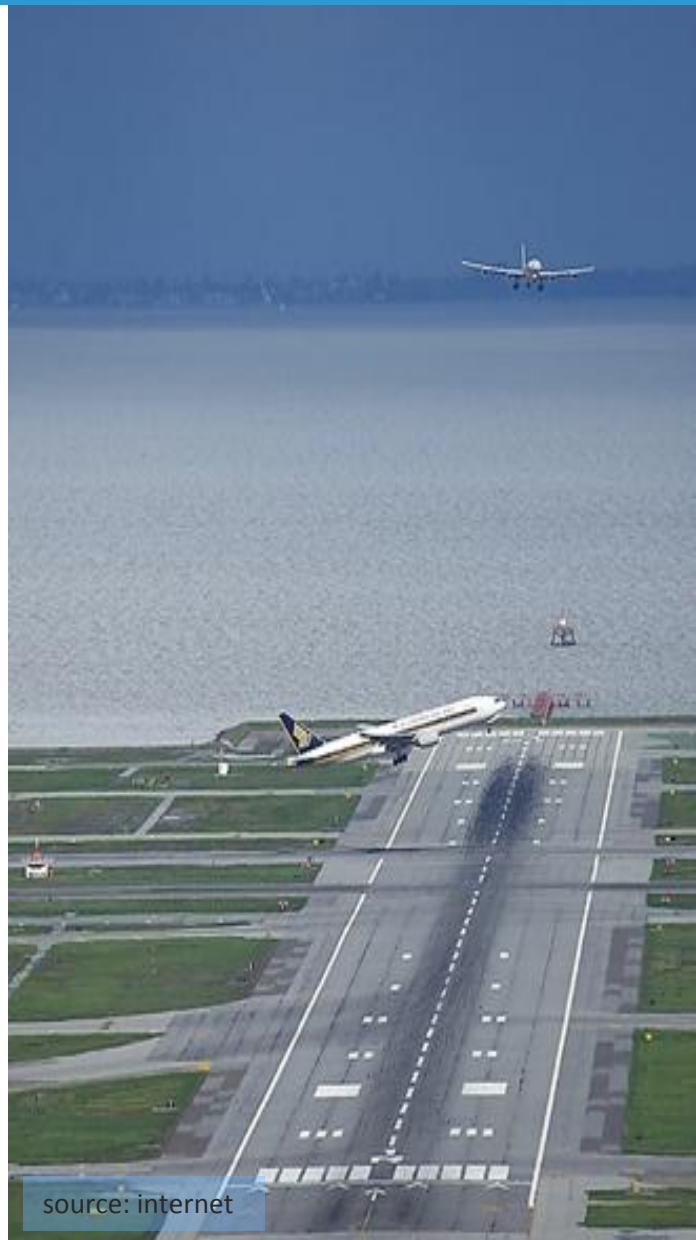
(1) 240 m where the code number is 3 or 4 and

(2) 120 m where the code number is 1 or 2 and the runway is an instrument one;

(b) Notwithstanding the provisions in (a) above, the length of the runway end safety area may be reduced where an arresting system is installed, based on the design specifications of the system.

(c) Width of RESA

The width of a runway end safety area should be at least twice that of the associated runway and, wherever practicable, be equal to that of the graded portion of the associated runway strip.



source: internet

Obstacle Limitation Requirements EASA CS

CS ADR-DSN.J.475 Non-precision approach runways

(a) The following obstacle limitation surfaces should be established for a non-precision approach runway:

(1) conical surface;

(2) inner horizontal surface;

(3) approach surface; and

(4) transitional surfaces.

Obstacle Limitation Requirements EASA CS

ADR CS CHAPTER J

(b) The heights and slopes of the surfaces should not be greater than, and their other dimensions not less than, those specified in Table J-1, except in the case of the horizontal section of the approach surface (see paragraph (c) below).

(c) The approach surface should be horizontal beyond the point at which the 2.5 % slope intersects:

(1) a horizontal plane 150 m above the threshold elevation; or

(2) the horizontal plane passing through the top of any object that governs the obstacle clearance altitude/height (OCA/H);

whichever is the higher.

(d) New objects or extensions of existing objects should not be permitted above an approach surface within 3 000 m of the inner edge or above a transitional surface except when the new object or extension would be shielded by an existing immovable object.

(e) New objects or extensions of existing objects should not be permitted above the approach surface beyond 3 000 m from the inner edge, the conical surface or inner horizontal surface except when the object would be shielded by an existing immovable object, or after an safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

(f) Existing objects above any of the surfaces required by paragraph (a) should as far as practicable be removed except when the object would be shielded by an existing immovable object, or after safety assessment, it is determined that the object would not adversely affect the safety or significantly affect the regularity of operations of aeroplanes.

Example: THR 14

Threshold 14:

- **STRIP dimensions (RWY 14 NP App)**
- **Non frangible objects in Strip**
- **RESA not provided**
- **AD Fence**
- **Local road, mobile objects**

Example: THR 14

Situation:

- Aerodrome does not comply with the following CS requirements:
  - STRIP dimensions
  - local road infringe SRIP and RESA
  - RESA is not installed
  - Take off Surface for RWY 32 / Approach Surface for RWY 14 are not obstacle free: ADR fence, local road, mobile objects

Possible solutions:

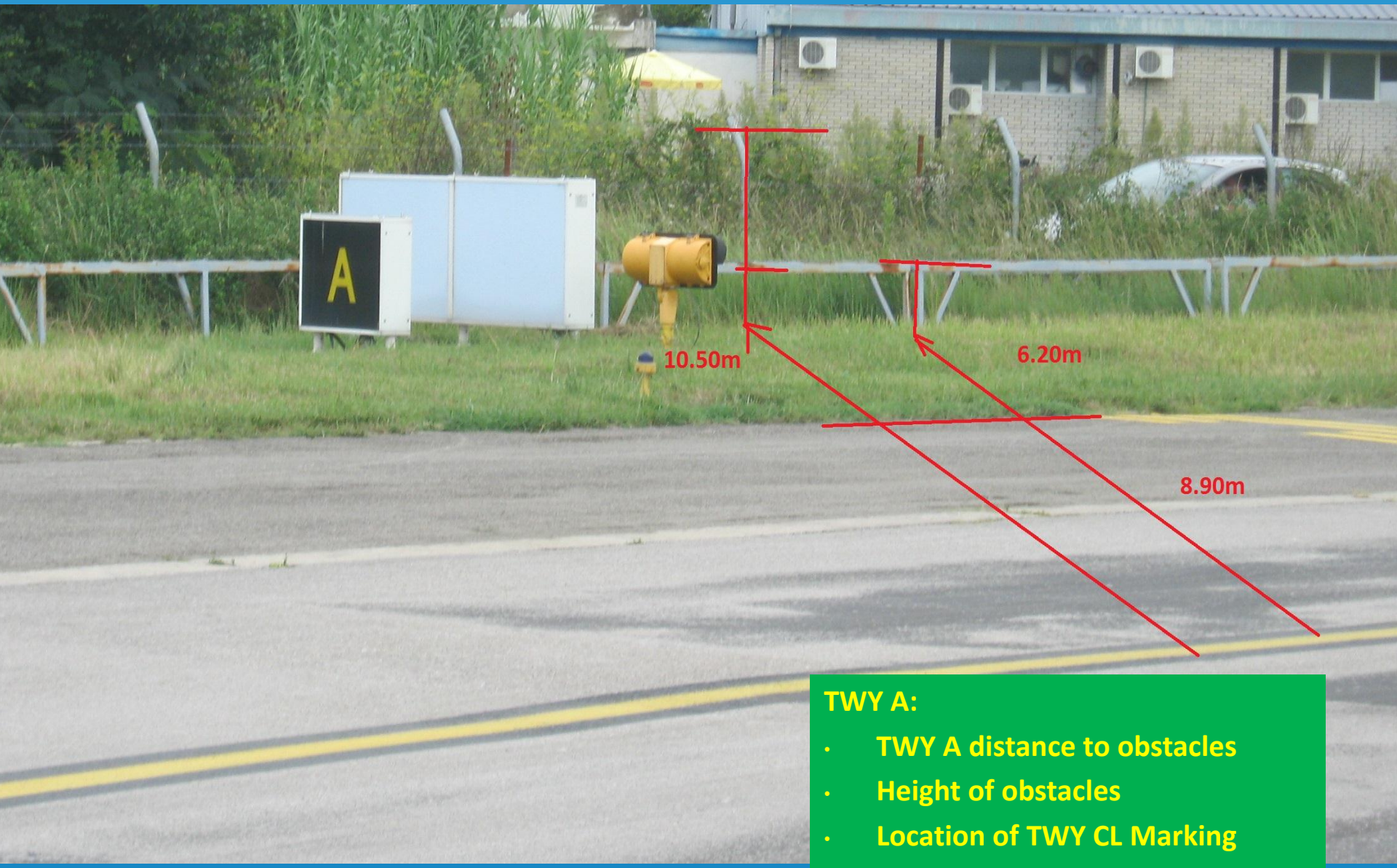
- The aerodrome operator has undertaken the safety assessment and shorten the RWY declared distances **(to meet some CS)**
- Safety assessment to regulate local traffic during aircraft operations **(SC)**
- Safety assessment for narrower STRIP & additional information published in AIP **(SC)**
- Removal of fix obstacles / fence relocation
- After a safety assessment the aerodrome operator could decide to install an EMAS arresting system **(ELOS)**
- **Any other proposal?**

Example: TWY A

TWY A:

- **TWY A distance to obstacles**
- **Height of obstacles**
- **Location of TWY CL Marking**
- **AD Fence, fixed obstacles**

Example: TWY A



TWY A:

- TWY A distance to obstacles
- Height of obstacles
- Location of TWY CL Marking
- AD Fence, fixed obstacles

Example: TWY A

Situation:

- Aerodrome does not comply with the following CS requirements:
  - TWY A distance to obstacles (fence, fixed obstacles, local road)
  - Height of obstacles
  - Location of TWY CL Marking

Possible solutions:

- Relocation of TWY centre line marking (safety assessment)
- Removal of fix obstacles / fence relocation
- Safety assessment to regulate local traffic during aircraft operations **(SC)**
- If safety assessment shows that fixed obstacles are not compromising the expected aircraft fleet to operate on TWY A **(SC)**
- AIP advises pilots to take extra care while taxiing past the infringement
- **Any other proposal?**

Example: THR 32

Example: THR 32

Situation:

- Aerodrome does not comply with the following CS requirements:
  - STRIP dimensions
  - local road infringe SRIP and RESA
  - RESA is not installed
  - Take off Surface for RWY 14 / Approach Surface for RWY 32, Transitional Surface are not obstacle free: ADR fence, local road, mobile objects

Possible solutions:

- The aerodrome operator has undertaken the safety assessment and shorten the RWY declared distances **(to meet some CS)**
- Safety assessment to handle fixed obstacles and fence in STRIP and RESA and actions for removal
- Safety assessment to regulate local traffic during aircraft operations **(SC)**
- Safety assessment for narrower STRIP & additional information published in AIP **(SC)**
- Future development plan shows the relocation of local road and fulfil the requirements for STRIP, RESA, OLS. Additional information in AIP. **(DAAD until this is the case)**
- After a safety assessment the aerodrome operator could decide to install an EMAS arresting system **(ELOS)**
- **Any other proposal ?**

Example: TWR height and location

TWR:

- **TWR Height**
- **Distance from STRIP and RWY**
- **Infringement of Transitional Surface**

Example: TWR height and location

Situation:

- Aerodrome does not comply with the following CS requirements:
  - TWR penetrating Transitional Surface

Possible solutions:

- The aerodrome operator has undertaken the safety assessment for the existing location and height of TWR **(SC)**
- Additional information published in AIP **(safety measure as condition accompanying the SC)**
- Future development plan provides a new location of TWR **(DAAD until this is the case)**

Example: Height of Apron Floodlighting

Apron Floodlighting

- **Location and Height**
- **Infringement of Transitional Surface**

Example: Height of Apron Floodlighting

Example: Height of Apron Floodlighting

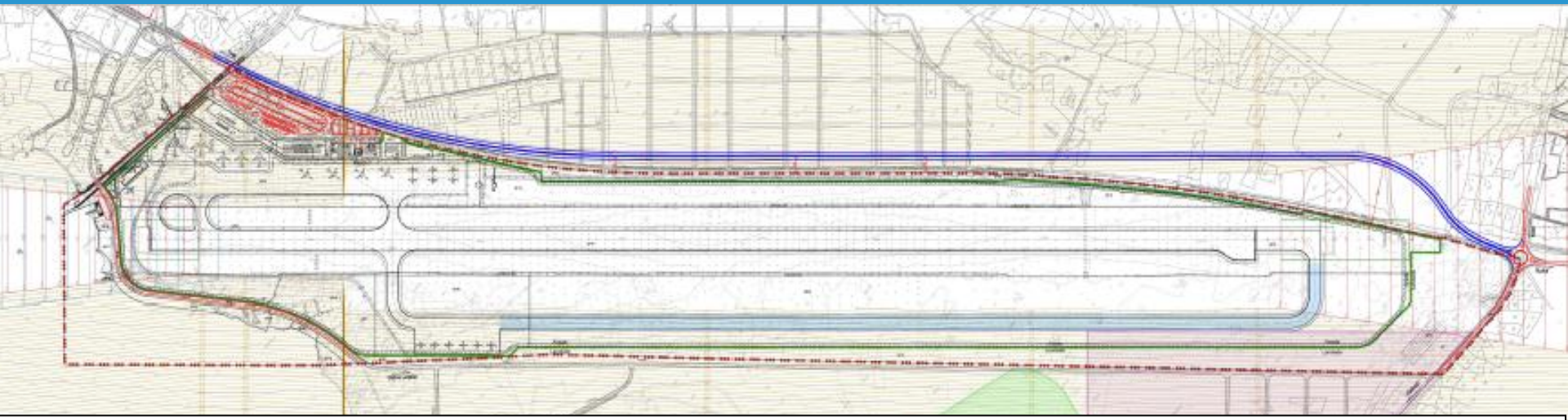
Situation:

- Aerodrome does not comply with the following CS requirements:
  - Apron Floodlighting pillars are penetrating Transitional Surface

Possible solutions:

- Relocation of Floodlights!?
- The aerodrome operator has undertaken the safety assessment for the existing location and height of Apron Floodlighting **(SC)**
- Additional information published in AIP **(safety measure as condition accompanying the SC)**
- Future development plan provides a new location of TWR **(DAAD until this is the case)**
- **Any other proposal?**

Example: Future ADR developments



Annex 14, Am. 11-B, Annex 6, Am. 37-B (Date applicability: 13 November 2014):

Instrument runway.

a) *Non-precision approach runway.* A runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type A and a visibility not less than 1000 m.

Non-instrument runway. A runway intended for the operation of aircraft using visual approach procedures or an instrument approach procedure to a point beyond which the approach may continue in visual meteorological conditions.

Aerodrome operating minima. …

Instrument approach procedure (IAP). …

Non-precision approach (NPA) procedure. An instrument approach procedure designed for 2D instrument approach operations Type A.

PROBLEM: Yellow runway & taxiway markings

PROBLEM: Yellow runway & taxiway markings

Situation:

- In the past the national airport company decided together with pilots to have yellow runway markings at all airports in the northern country.
- This was not conform with Annex 14 and was a contributory factor for a serious incident in 2010.
- Now situation is also non-conform with CS.

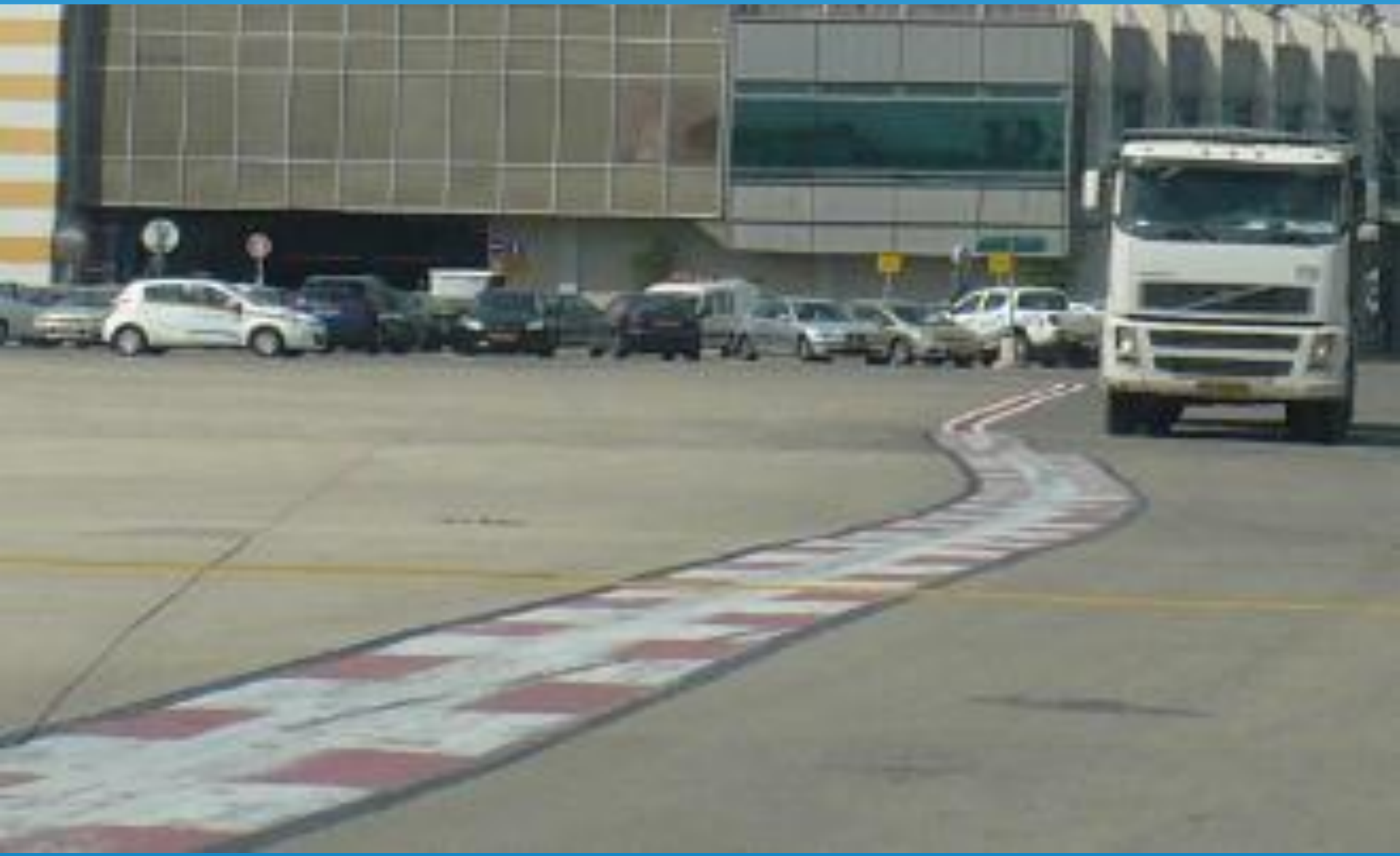
The next issue of the Norwegian AIP will say the following: 5.2.1.4: Norway is changing the colour of runway markings from yellow to white.

In a transition period until 31.12.2017 some runways will still have yellow markings.

Solution:

- The aerodrome operator reacted to the AIB report and re-considered.
- In principle EASA rules allow for situation to be safety assessed.
- But, authority should not allow this situation due to risk of confusion of pilots.
- Up to CAA and operator have decided to **phase out markings out and to mark the runways white. Removal of deviation.**

PROBLEM: Apron service road marking



PROBLEM: Apron service road marking

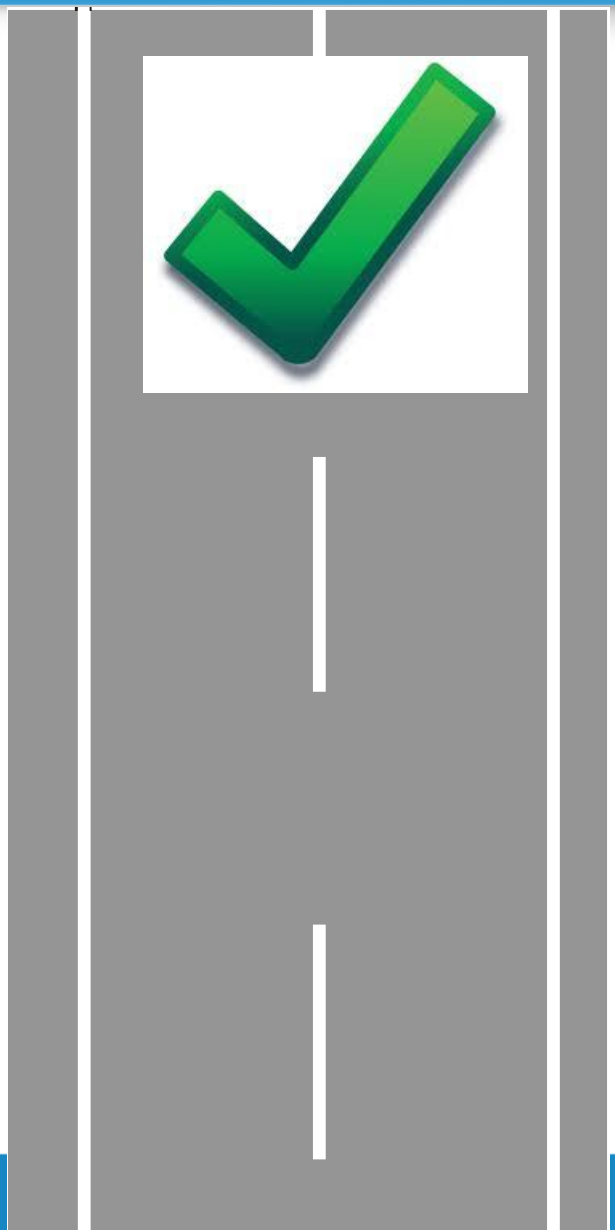
Situation:

- The apron road marking contains red colour (ACI handbook suggests the use of only white lines)
- Airport has put markings that are the same as the local road edge side marking (alternating red and white)

Solution:

- The aerodrome operator want this to be accepted.
- European Authority **should disagree** because the red colour line crosses the yellow a/c taxi way and would require pilot to request ATC permission to cross.
- Better service road markings recommended (see next page)

PROBLEM: Apron service road marking



EASA
European Aviation Safety Agency

Thank you!

Your safety is our mission.

An agency of the European Union