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Brussels airport

RUNWAY PERFORMANCE REPORT 2019

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EXECUTIVE SUMMARY

As stated on the Brussels Airport website, there was a slight increase in passenger flights (+0.2%) but a decrease in cargo flights (-2.2%) and more notably in non-commercial flights (-6.5%), resulting in an overall decrease of 0.4% in total movements. The number of passengers went up by 5.1%, implying that the aircraft occupancy rate was higher.

Further details are given about the movements in 2019 in the first chapter of this report: the busiest day this year was the 2nd of July, with 803 movements, while the average of 2019 was of 642 movements per day. Distribution of air traffic throughout the hours of the day, seasons of the year and per runway can also be found in this chapter. Traffic levels throughout the year have followed similar patterns as over the past four years, with more traffic recorded in the summer due to increased activity of commercial airlines. The report also analyses the distribution of movements throughout the day, for every day of the week. This distribution has also been constant in the past four years. As for the use of runways, no significant difference in runway use can be noticed between 2019 and the previous years.

The national strike in February resulted in the closure of airspace for 24 hours, affecting all operators at Brussels Airport and leading to a reduction in the number of flights for this specific month.

Air Traffic Management (ATM) Performance is driven by four Key Performance Areas (KPAs): safety, capacity, environment and cost-efficiency. This report focuses on skeyes' operations at Brussels Airport (ICAO code EBBR). Its aim is to provide our main stakeholders with traffic figures for 2019 and relevant data on the performance of our operations at EBBR, namely on three of the four KPA's: safety, capacity and environment.

Safety

Two types of occurrences are analysed in this report, both giving a view on airport safety performance: missed approaches and runway incursions (RI). Overall, 2019 has seen an increase in terms of missed approaches. On all runways, there has been an increase of missed approaches because aircraft were too close behind preceding, or the previous aircraft was still on the runway. It has been recommended that a survey is carried out to investigate this increase and further optimize working methods between the approach (APP) and the tower (EBBR). The fact that "unstable approach" has been the main reason for missed approaches on 07L for the past four years is attributable to the different equipment available for that runway (VOR approach offset with respect to the runway centreline for 07L). The most common reason on 07R being a "previous landing on the RWY" can be linked to the absence of a taxiway at the end of runway 07R.

That is why skeyes advises the implementation of precision approaches: installation of an ILS on RWY 07L and permanent publication of Required Navigation Performance (RNP) approach procedures with vertical guidance for runways 07L and 07R.

Even though there was one recorded runway incursion with ATM contribution (classified as having no immediate safety effect), overall the number of runway incursions has decreased.

Capacity and Punctuality

Capacity and delay go hand in hand when it comes to runway performance. As in previous years, the throughput capacity of the airport is analysed by comparing the actual traffic with the declared IFR capacity. On seven occasions was the declared capacity exceeded in 2019, all of them when a crossed runway configuration was in use. On average in 2019, the traffic at peak hours was 18.9 movements below the declared capacity.

A closer look into the theoretical arrival and departure slack capacities leads to the conclusion that departures are sometimes a limiting factor to reach full capacity in the parallel runway configuration. An operational explanation for this is the effort made to offer airlines with shorter taxi times by giving them a landing clearance on 25R rather than 25L. This can result in insufficient slots to allow departures on 25R. 25L is not considered to be a departure RWY in the Preferential Runway System (PRS) (the lack of a taxiway to the runway threshold requires a backtrack for departures to take place), and this RWY's capacity is lower compared to 25R.

Arrival delay is analysed, as a performance target has been set for EBBR, defined as the average ATFM delay (in minutes) per flight, attributable to skeyes. The arrival delay due to causes considered to be with Air Navigation Service Provider (ANSP) contribution in 2019 had an average of 0.08 minutes/flight, below the defined target of 0.11 minutes/flight.

New to this edition of the RWY Performance report are the details of the delays from the airport's point of view, i.e. considering the impact caused by regulations not only at EBBR, but also in the Belgian en-route airspace and by other Air Navigation Service Providers.

In 2019, 31,932 departing flights from Brussels Airport were delayed resulting in a total of 470,012 minutes of delay. 27.0% of that delay is attributable to skeyes while 73.0% is attributable to other ANSPs. The distribution of the delay is worth mentioning, with most of the delayed flights (62.9%) delayed for a maximum 15 minutes and only 1.6% delayed more than one hour. Regarding arrivals, 27,253 flights with destination Brussels Airport were delayed and experienced a total of 453,104 minutes of delay. 50.1% of that delay is attributable to skeyes while 49.9% is attributable to ATFM measures by other ANSPs. Less than 10% of flights were delayed for more than 30 minutes, out of which 1.2% were delayed over one hour.

Environment

Because of its geographical location in a densely populated area, it is important to consider noise distribution around the airport. The selection of runways, the number of green landings and the amount of night movements are analysed in this chapter.

The PRS has been in use more often in 2019 than in 2018, with an average of 78% in terms of hours, and 84% in terms of flights. Though the use of the PRS fluctuates throughout the year, monthly it has been in use for more than 72% of the time except for one month: in April the meteorological conditions were the main reason for the low PRS use (49%). During that month, the wind mainly came from the north east, not allowing for the use of runways 25L and 25R. As expected, the meteorological conditions at/near the airport compose almost 80% of the reasons for the non-use of the PRS, as it has been the case in the past four years.

Continuous descent operations (CDO), also called green landings, have been registered at EBBR since 2016. CDO percentages are quite stable over the past four years, with the two performance indicators CDO Noise close to 60%, and the CDO Fuel around 80%. When looking at the CDOs flown per runway, it can also be seen that ratio of CDOs flown are comparable to the previous year for each runway.

Note that both PRS and CDO data can also be found on the Brussels Airport Traffic Control (BATC) website: www.batc.be.

At Brussels Airport, the maximum number of night slots that can be allocated is set by the federal government, through the Ministerial Decree of the 21st of January 2009. This decree states that a maximum of 16,000 night slots per calendar year can be allocated. Night is from 23:00 to 06:00 local time. In 2019, 17,347 night movements were recorded at Brussels Airport by the Airport Management System, a decrease of 351 flights compared to 2018. Note that this does not imply that the legal limit of slots was exceeded, as this number includes flights with evening slots which operated after 23:00 due to delays, as well as flights with military or diplomatic status or helicopter flights which are exempted from slot allocation.

SAMENVATTING

Zoals vermeld op de website van Brussels Airport nam het aantal passagiersvluchten licht toe (+0,2%) en kromp het aantal vrachtvluchten (-2,2%), en in sterkere mate het aantal niet-commerciële vluchten (-6,5%), met als gevolg een algemene daling van 0,4% van het totale aantal bewegingen. Het aantal passagiers steeg met 5,1%, wat betekent dat de bezettingsgraad van het vliegtuig hoger was.

Meer details over de bewegingen in 2019 worden in het eerste hoofdstuk van dit verslag gegeven. Zo was de drukste dag van 2019 2 juli met 803 bewegingen, terwijl het gemiddelde in 2019 642 bewegingen per dag bedroeg. In dat hoofdstuk kan u ook de spreiding van het verkeer over het tijdstip van de dag, de seizoenen van het jaar en per baan terugvinden. De verkeersniveaus in de loop van het jaar volgden gelijkaardige patronen als tijdens de afgelopen vier jaar, waarbij in de zomer meer verkeer werd geregistreerd als gevolg van de toegenomen activiteit van de commerciële luchtvaartmaatschappijen. Het verslag analyseert ook de spreiding van de bewegingen overdag, voor elke dag van de week. Ook deze spreiding is de afgelopen vier jaar constant geweest. Wat het gebruik van de start- en landingsbanen betreft, is er geen significant verschil in het gebruik ervan tussen 2019 en de jaren daarvoor.

De nationale staking in februari leidde tot een 24 uur lange sluiting van het luchtruim die alle operatoren op Brussels Airport trof en waardoor het aantal vluchten voor deze specifieke maand daalde.

Air Traffic Management-prestaties (ATM) worden gedreven door vier kernprestatiegebieden (Key Performance Areas of KPA's): veiligheid, capaciteit, milieu en kostenefficiëntie. Dit verslag richt zich op skeyes' operaties op Brussels Airport (ICAO-code EBBR). Het doel is om onze belangrijkste stakeholders de verkeerscijfers voor 2019 en relevante gegevens over de prestaties van onze activiteiten op EBBR te verschaffen, namelijk inzake drie van de vier KPA's: veiligheid, capaciteit en milieu.

Veiligheid

In dit verslag worden twee soorten voorvallen geanalyseerd, die beiden een beeld geven van de veiligheidsprestaties op de luchthaven: gemiste naderingen en runway incursions (RI). In het algemeen nam het aantal gemiste naderingen in 2019 toe, en dat op alle banen omdat de vliegtuigen te kort op elkaar volgden, of omdat het vorige vliegtuig zich nog op de baan bevond. Het wordt aanbevolen om de toename verder te onderzoeken en de werkmethodes tussen de Approach (APP) en Tower (EBBR) units onder de loep te nemen om deze verder te optimaliseren. Het feit dat 'onstabiele nadering' de belangrijkste reden is geweest voor de gemiste naderingen op 07L in de afgelopen vier jaar, zou kunnen worden toegeschreven aan de verschillende soorten uitrusting beschikbaar voor die baan (VOR-naderingscompensatie ten opzichte van de hartlijn van de baan voor 07L). Het feit dat de meest voorkomende reden op 07R een 'vorige landing op de baan' was, kan worden gekoppeld aan het ontbreken van een taxibaan aan het einde van baan 07R.

Daarom adviseert skeyes om precisienaderingen te implementeren: installatie van een ILS op baan 07L en permanente publicatie van Required Navigation Performance (RNP) naderingen met verticale geleiding voor banen 07L en 07R.

Ook al was er één geregistreerde RI waarin ATM een verantwoordelijkheid droeg (geclassificeerd als zijnde zonder onmiddellijk veiligheidseffect), is het aantal RI over het algemeen afgenomen.

Capaciteit en stiptheid

Capaciteit en vertraging gaan hand in hand als het gaat om baanprestaties. Net zoals de voorbije jaren wordt de doorvoercapaciteit van de luchthaven geanalyseerd, waarbij het werkelijke verkeer wordt vergeleken met de opgegeven IFR-capaciteit. In 2019 werd de opgegeven capaciteit slechts zeven keer overschreden, uitsluitend bij gebruik van een gekruiste baanconfiguratie. Gemiddeld lag het verkeer in 2019 tijdens de piekuren 18,9 bewegingen lager dan de opgegeven capaciteit.

Nader onderzoek van de theoretische onderbenutte aankomst- en vertrekcapaciteit leidt tot de conclusie dat vertrekken soms een beperkende factor zijn om de volledige capaciteit in de parallelle baanconfiguratie te bereiken. Een operationele verklaring daarvoor schuilt in de inspanning om luchtvaartmaatschappijen kortere taxitijden te bieden door hun een landingsklaring te geven op baan 25R in plaats van baan 25L. Dat kan aanleiding geven tot een gebrek aan slots om vertrekken vanop baan 25R mogelijk te maken. Aangezien 25L niet wordt beschouwd als een startbaan in het systeem voor preferentieel baangebruik - het ontbreken van een taxibaan naar de baandrempel vereist een backtrack voor de vertrekken - wordt deze baan niet ten volle benut.

Aangezien er een prestatiedoelstelling voor EBBR vastgelegd werd, wordt de vertraging bij aankomst, gedefinieerd als de gemiddelde ATFM-vertraging (in minuten) per vlucht die toe te schrijven is aan skeyes, als dusdanig geanalyseerd. De vertraging bij aankomst als gevolg van oorzaken die worden beschouwd als een bijdrage van de luchtvaartnavigatiedienstverlener (ANSP) bedroeg in 2019 gemiddeld 0,08 minuten/vlucht, wat lager ligt dan de vastgelegde doelstelling van 0,11 minuten/vlucht.

Nieuw in deze editie van het RWY Performance-verslag zijn de details van de vertragingen vanuit het oogpunt van de luchthaven, d.w.z. rekening houdend met de impact van de reguleringen, niet alleen op EBBR, maar ook in het Belgische en-routeluchtruim en door andere luchtvaartnavigatiedienstverleners.

In 2019 hadden 31.932 vertrekkende vluchten vanaf Brussels Airport vertraging, goed voor 470.012 minuten vertraging in totaal. 27,0% van die vertraging is toe te schrijven aan skeyes, terwijl 73,0% te wijten is aan andere ANSP's. De spreiding van de vertraging is het vermelden waard: de meeste vertraagde vluchten (62,9%) hadden hoogstens 15 minuten vertraging en slechts 1,6% had meer dan een uur vertraging. Wat de aankomsten betreft, hadden 27.253 vluchten met bestemming Brussels Airport vertraging, in totaal goed voor 453.104 minuten. 50,1% van die vertraging is toe te schrijven aan skeyes, terwijl 49,9% te wijten is aan ATFM-maatregelen van andere luchtvaartnavigatiedienstverleners. Slechts 10% van de vluchten had een vertraging van meer dan 30 minuten en nauwelijks 1,2% had een vertraging van meer dan een uur.

Milieu

Vanwege de geografische ligging van de luchthaven in een dichtbevolkt gebied is het belangrijk om de geluidsverdeling rond de luchthaven te beschouwen. De keuze van de start- en landingsbanen, het aantal groene landingen en de hoeveelheid nachtbewegingen worden in dit hoofdstuk geanalyseerd.

In 2019 was het systeem voor preferentieel baangebruik (PRS, Preferential Runway System) vaker in gebruik dan in 2018, met gemiddeld 78% in termen van uren, en 84% in termen van vluchten. Hoewel het gebruik van het PRS het hele jaar door schommelt, wordt het op maandbasis meer dan 72% van de tijd gehanteerd, op één maand na: in april waren de weersomstandigheden de belangrijkste reden voor het feit dat het PRS minder nageleefd werd. Tijdens die maand kwam de wind voornamelijk uit het noordoosten, waardoor het gebruik van banen 25L en 25R niet mogelijk was. Zoals verwacht vormen de weersomstandigheden op/nabij de luchthaven bijna 80% van de redenen waarom het PRS niet wordt gebruikt, en dat is de afgelopen vier jaar ook het geval geweest.

Sinds 2016 zijn er op EBBR Continuous Descent Operations (CDO), ook wel groene landingen genoemd, in voege. De CDO-percentages bleven vrij stabiel de afgelopen vier jaar, met de twee prestatie-indicatoren CDO Noise schommelend rond 60% en CDO Fuel schommelend rond 80%. Kijken we naar de gevlogen CDO per baan, dan stellen we ook daar vast dat de verhouding van die bewuste vluchten voor elke baan vergelijkbaar is met het jaar ervoor.

Merk op dat zowel PRS- als CDO-gegevens ook te vinden zijn op de website van Brussels Airport Traffic Control (BATC): www.batc.be.

Op Brussels Airport wordt het maximumaantal nachtslots die kunnen worden toegewezen, vastgelegd door de federale overheid, uit hoofde van het Ministerieel Besluit van 21 januari 2009. Dit besluit bepaalt dat er maximaal 16.000 nachtslots per kalenderjaar kunnen worden toegewezen. De nacht wordt beschouwd als een periode van 23.00 uur tot 06.00 uur lokale tijd. Het Airport Management System (AMS) registreerde in 2019 17.347 nachtbewegingen op Brussels Airport, wat een daling met 351 vluchten betekent in vergelijking met 2018. Merk op dat dit niet inhoudt dat de wettelijke limiet werd overschreden, want dit aantal omvat vluchten met avondslots die na 23.00u worden uitgevoerd wegens vertragingen, en vluchten die zijn vrijgesteld van slottoewijzing (militaire, diplomatieke of helikoptervluchten).

SYNOPSIS

Comme mentionné sur le site web de Brussels Airport, on observe une légère augmentation des vols passagers en 2019 (+ 0,2%) mais une baisse des vols cargo (-2,2%) et plus particulièrement des vols non commerciaux (-6,5%), ce qui entraîne une diminution globale de 0,4% des mouvements totaux. Le nombre de passagers a augmenté de 5,1%, ce qui implique que le taux d'occupation des avions était plus élevé. Vous trouverez de plus amples détails sur les mouvements en 2019 dans le premier chapitre de ce rapport. Le 2 juillet 2019 fut la journée la plus chargée, avec 803 mouvements, alors que la moyenne de 2019 était de 642 mouvements par jour. La répartition du trafic sur les heures de la journée, les saisons de l'année et par piste se trouve également dans ce chapitre. Les niveaux de trafic tout au long de l'année ont suivi des tendances similaires à celles des quatre dernières années, avec plus de trafic enregistré pendant l'été suite à l'activité accrue de l'aviation commerciale. Le rapport analyse également la répartition des mouvements tout au long de la journée, pour chaque jour de la semaine. Cette répartition a également été constante au cours des quatre dernières années. Quant à l'utilisation des pistes, on ne remarque pas de différence significative dans l'utilisation des pistes entre 2019 et les années précédentes.

La grève nationale en février a entraîné la fermeture de l'espace aérien durant 24 heures, affectant tous les opérateurs à Brussels Airport et entraînant une diminution du nombre de vols pour ce mois en particulier.

Les performances de la gestion du trafic aérien (ATM – Air Traffic Management) reposent sur quatre domaines de performance clés (KPA – Key Performance Areas) : la sécurité, la capacité, l'environnement et l'efficacité économique. Le présent rapport se focalise sur les opérations de skeyes à Brussels Airport (code OACI : EBBR). Son objectif est de fournir à nos principaux stakeholders les chiffres du trafic pour 2019 et des données pertinentes sur la performance de nos opérations à EBBR, à savoir pour trois des quatre KPA : la sécurité, la capacité et l'environnement.

Sécurité

Deux types d'évènements sont analysés dans ce rapport, tous deux donnant un aperçu des performances de la sécurité aux aéroports : les approches interrompues et les incursions de piste (Runway Incursions, RI). Globalement, 2019 a connu une augmentation du nombre d'approches interrompues. Les approches interrompues ont augmenté sur toutes les pistes parce qu'un avion était trop proche du précédent ou que l'avion précédent se trouvait toujours sur la piste. Il a été recommandé de mener une étude pour examiner les méthodes de travail entre l'unité d'approche et de la tour EBBR afin d'enquêter sur cette augmentation. L'approche instable est la principale raison des approches interrompues sur la piste 07L au cours des quatre dernières années et est due aux différents équipements disponibles pour cette piste (désaxage de l'approche VOR par rapport à l'axe de piste pour la 07L). La raison la plus courante pour la piste 07R d'avoir un ''atterrissage précédent sur la piste'' peut être liée à l'absence de voie de circulation au bout de la piste 07R.

C'est pourquoi skeyes recommande d'implémenter des approches de précision : installation d'un ILS sur la piste 07L et publication permanente des procédures d'approche Required Navigation Performance (RNP) avec guidage vertical pour les pistes 07L et 07R.

Même si on a enregistré une incursion de piste imputable à l'ATM (classée comme n'ayant pas d'effet immédiat sur la sécurité), dans l'ensemble, le nombre d'incursions de piste a diminué.

Capacité et ponctualité

Sur le plan de la performance des pistes, la capacité et les retards sont indissociables. Comme les années précédentes, on analyse la capacité de transport de l'aéroport en comparant le trafic réel à la capacité IFR déclarée. En 2019, la capacité déclarée n'a été dépassée qu'à sept reprises, chaque fois lorsqu'une configuration de pistes croisées était utilisée. En moyenne en 2019, le trafic aux heures de pointe était de 18,9 mouvements inférieurs à la capacité déclarée.

Il ressort d'un examen plus approfondi de la faible capacité théorique des arrivées et des départs que les départs sont parfois un facteur limitatif pour atteindre la pleine capacité dans la configuration de pistes parallèles. Une explication opérationnelle à cela est l'effort consenti pour offrir des temps de circulation au sol plus courts aux compagnies aériennes en leur donnant une autorisation d'atterrissage sur la 25R plutôt que sur la 25L. Cela peut entraîner un manque de slots suffisants pour permettre des départs à partir de la 25R. Etant donné que la 25L n'est pas considérée comme une piste de décollage dans le système d'utilisation préférentielle des pistes (l'absence de voie de circulation jusqu'au seuil de piste nécessite une marche arrière pour les départs), cette piste n'est pas utilisée à sa pleine capacité.

Le retard à l'arrivée est analysé, car un objectif de performance a été fixé pour EBBR, défini comme le retard ATFM moyen (en minutes) par vol, imputable à skeyes. Le retard à l'arrivée dû à des causes considérées comme étant imputables au prestataire de services de navigation aérienne (ANSP) en 2019 s'élevait en moyenne à 0,08 minute/vol, soit sous l'objectif défini de 0,11 min/vol.

Ce qui est neuf dans cette édition du Rapport sur la Performance des pistes, ce sont les détails des retards du point de vue de l'aéroport, c.-à-d. compte tenu de l'impact causé par les régulations non seulement à EBBR, mais aussi dans l'espace aérien en route belge et par d'autres prestataires de services de navigation aérienne.

En 2019, 31.932 départs ont été retardés à Brussels Airport, soit un total de 470.012 minutes de retard, dont 27,0% sont imputables à skeyes et 73,0% à d'autres ANSP. La répartition des retards mérite d'être mentionnée, la plupart des vols (62,9%) étant retardés de 15 minutes maximum et seulement 1,6% est retardé de plus d'une heure. A propos des arrivées, 27.253 vols à destination de Brussels Airport ont été retardés, accusant au total un retard de 453.104 minutes, dont 50,1% imputables à skeyes et 49,9% aux mesures AFTM imposées par d'autres ANSP. Seuls 10% des vols ont été retardés de plus de 30 minutes et seuls 1,2% ont été retardés de plus d'une heure.

Environnement

En raison de sa situation géographique dans une zone densément peuplée, il est important de tenir compte de la répartition du bruit autour de l'aéroport. Le choix des pistes, le nombre d'atterrissages verts et la quantité de mouvements nocturnes sont analysés dans ce chapitre.

Le système d'utilisation préférentielle des pistes (Preferential Runway System, PRS) a été utilisé plus souvent en 2019 qu'en 2018, avec une moyenne de 78% en termes d'heures et de 84% en termes de vols. Bien que l'utilisation du PRS fluctue toute l'année, il a été utilisé pendant plus de 72% du temps sur une base mensuelle, sauf pour un mois. En effet, en avril, les conditions météorologiques ont été la principale raison de la faible application du PRS. Durant ce mois, le vent venait principalement du nord-est, ce qui ne permet pas d'utiliser les pistes 25L et 25R. Comme prévu, les conditions météorologiques à/près de l'aéroport constituent presque 80% des raisons de la non-utilisation du PRS, comme ce fut le cas au cours des quatre dernières années.

Les Continuous Descent Operations (CDO), également appelées atterrissages verts, sont en vigueur à EBBR depuis 2016. Les pourcentages de CDO sont assez stables au cours des quatre dernières années, avec les deux indicateurs de performance CDO Noise proches de 60% et CDO Fuel autour de 80%. Lorsque l'on considère les CDO effectuées par piste, on constate également que le ratio des CDO effectuées est similaire à celui de l'année précédente pour chaque piste.

Notez que les données PRS et CDO se trouvent également sur le site web de Brussels Airport Traffic Control (BATC) : www.batc.be.

A Brussels Airport, le nombre maximum de slots de nuit pouvant être attribués est fixé par le gouvernement fédéral, sur base de l'Arrêté ministériel du 21 janvier 2009. Cet Arrêté stipule qu'un maximum de 16.000 slots de nuit peuvent être attribués par année civile. Une nuit est censée débuter à 23h00 et se terminer à 06h00 heure locale. En 2019, 17.347 mouvements de nuit ont été enregistrés par le Airport Management System de skeyes à Brussels Airport, soit une baisse de 351 vols par rapport à 2018. Il convient de noter que cela ne signifie pas que la limite légale des slots a été dépassée, puisque ce nombre comprend des vols avec des slots de soirée qui ont été opérés après 23:00 en raison de retards, ainsi que des vols avec statut militaire ou diplomatique, ou des vols en hélicoptère, qui sont exemptés d'attribution de slots.

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ACRONYMS

ACFT: Aircraft
AIP: Aeronautical Information Publication
AMS: Airport Movement System
ANSP: Air Navigation Service Provider
ARR: Arrival
ATC: Air Traffic Control
ATCO: Air Traffic Control Officer
ATFM: Air Traffic Flow Management
ATM: Air Traffic Management
BCAA: Belgian Civil Aviation Authority
CDO: Continuous Descent Operation
CRSTMP: C-Capacity, R-Routing, S-Staffing, T- Equipment, M- Airspace Management, P- Special Event
CTOT: Calculated Take-Off Time
CTR: Control Zone of an Airport
DEP: Departure
EBAW: Antwerp airport ICAO Code
EBBR: Brussels airport ICAO Code
EBCI: Charleroi airport ICAO Code
EBKT: Kortrijk airport ICAO Code
EBLG: Liège airport ICAO Code
EBOS: Ostend airport ICAO Code
ETOT: Estimated Take-Off Time
EU: European Union
FABEC: Functional Airspace Block Europe Central
FL: Flight Level
FOD: Foreign Object Debris
ICAO: International Civil Aviation Organization
IFR: Instrument Flight Rules
KPA: Key Performance Area
KPI: Key Performance Indicator
LVO: Low Visibility Operations
M/A: Missed Approach
MCT: Maximum Capacity Throughput
MVT: Mixed Volume Traffic
NM: Nautical Mile
NM: Network Manager (EUROCONTROL)
PRS: Preferential Runway System
RAT: Risk Analysis Tool
RI: Runway Incursion
RNP: Required Navigation Performance
PRU: Performance Review Unit
ROTA: Runway Occupancy Time for Arrival
RWY: Runway
VFR: Visual Flight Rules

1. TRAFFIC

In this chapter, the traffic at Brussels Airport is presented, as recorded by the Airport Movement System (AMS) developed by skeyes. The AMS records the movements at an aerodrome and within its Control Zone (CTR), which are defined as an aircraft either crossing the CTR, landing or taking off at the aerodrome.

The figures presented throughout the report consider a movement as a take-off or landing of all traffic (VFR and IFR, helicopters and airplanes, commercial, military or general aviation). As this report considers runway performance, movements such as crossings of CTRs are not considered. As such[1]*:*

- *one take-off = one movement*
- *one landing = one movement*
- *one touch-and-go = two movements.*

[1] As per BCAA's aerodrome movement definition

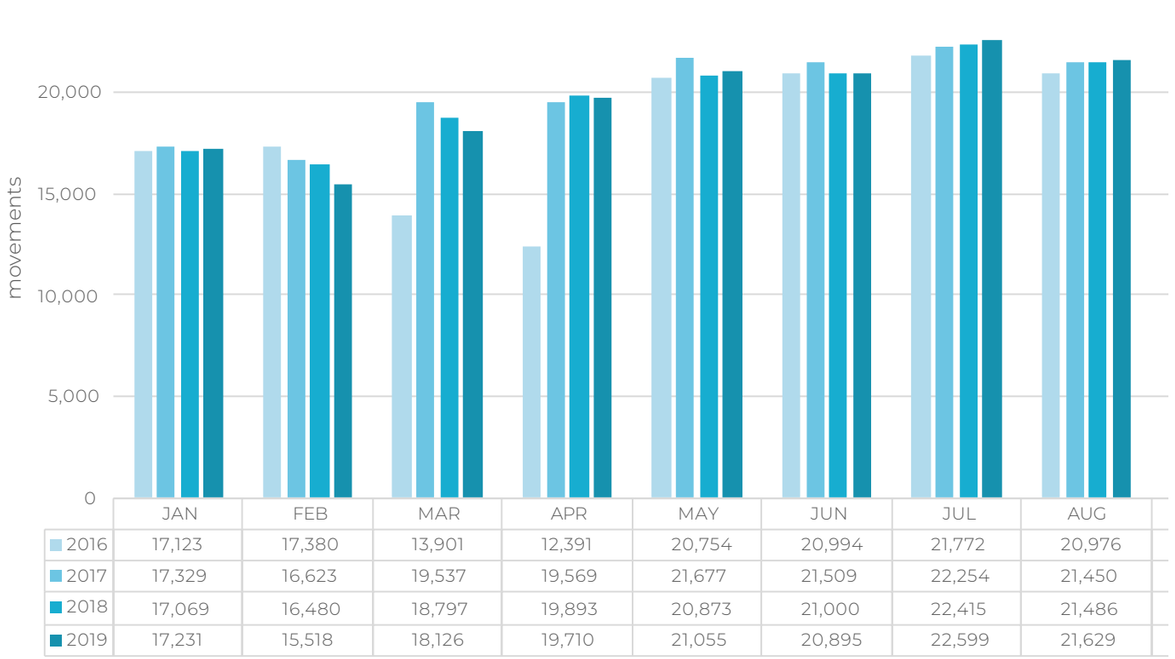
Steady traffic

The number of aircraft movements over the past four years are as follows:

- 2016: 223,687 (220,804 IFR; 2,883 VFR)
- 2017: 237,888 (234,894 IFR; 2,994 VFR)
- 2018: 235,459 (232,286 IFR; 3,173 VFR)
- 2019: 234,461 (231,274 IFR; 3,187 VFR).

The traffic figures remain steady if compared to 2017 and 2018, with VFR numbers representing around 1.3% of all movements at Brussels Airport.
This regularity can be observed in Figure 1-1 below. Only the dip in traffic recorded in 2016 after the terrorist attacks on March 22nd at Brussels Airport clearly stands out from the four-year monthly trends.

The highest traffic in 2019 was recorded in July with 22,599 movements, also the busiest month in the past four years.



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2016	17,123	17,380	13,901	12,391	20,754	20,994	21,772	20,976	21,675	20,576	18,341	17,804
2017	17,329	16,623	19,537	19,569	21,677	21,509	22,254	21,450	21592	21,062	18,387	16,899
2018	17,069	16,480	18,797	19,893	20,873	21,000	22,415	21,486	21,331	20,021	18,699	17,395
2019	17,231	15,518	18,126	19,710	21,055	20,895	22,599	21,629	21,533	20,622	18,064	17,479

Figure 1-1: Total monthly movements per year

Table 1-1 below shows the decomposition of the total movements in numbers of arrivals and departures. As the overall traffic at Brussels Airport in 2019 was similar to the previous years, so were the arrival and departure rates.

Table 1-1: Monthly arrival and departure movements per year

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ARR	**2016**	8,557	8,691	6,940	6,205	10,383	10,490	10,880	10,494	10,835	10,290	9,178	8,904	111,847
	2017	8,660	8,309	9,767	9,783	10,846	10,743	11,132	10,725	10,799	10,528	9,197	8,451	118,940
	2018	8,530	8,237	9,403	9,946	10,437	10,500	11,209	10,737	10,668	10,016	9,347	8,697	117,727
	2019	8,607	7,760	9,062	9,862	10,522	10,461	11,291	10,817	10,764	10,304	9,044	8,739	117,233
DEP	**2016**	8,566	8,689	6,961	6,186	10,371	10,504	10,892	10,482	10,840	10,286	9,163	8,900	111,840
	2017	8,669	8,314	9,770	9,786	10,831	10,766	11,122	10,725	10,793	10,534	9,190	8,448	118,948
	2018	8,539	8,243	9,394	9,947	10,436	10,500	11,206	10,749	10,663	10,005	9,352	8,698	117,732
	2019	8,624	7,758	9,064	9,848	10,533	10,434	11,308	10,812	10,769	10,318	9,020	8,740	117,228

Busy days

The top ten (10) busiest days of 2019 for Brussels Airport are depicted in Figure 1-2 below. The most active days all took place during the summer, between June and September. The 2nd of July recorded the highest amount of traffic with 803 movements, while the average of 2019 was 642 movements per day.

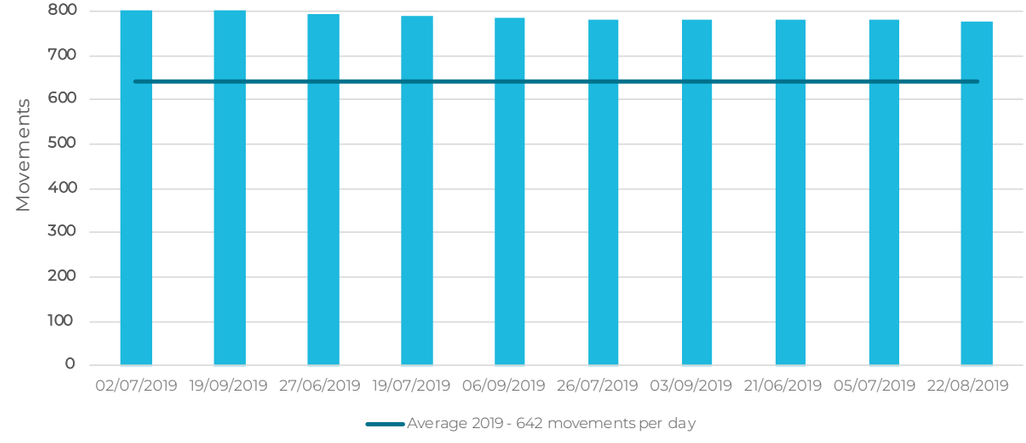


Figure 1-2: Ten days with highest amount of traffic in 2019

Even though the overall traffic remains similar to the past three years, there is only one day of 2019 making it to the top ten busiest days since 2016, as shown in Figure 1-3.

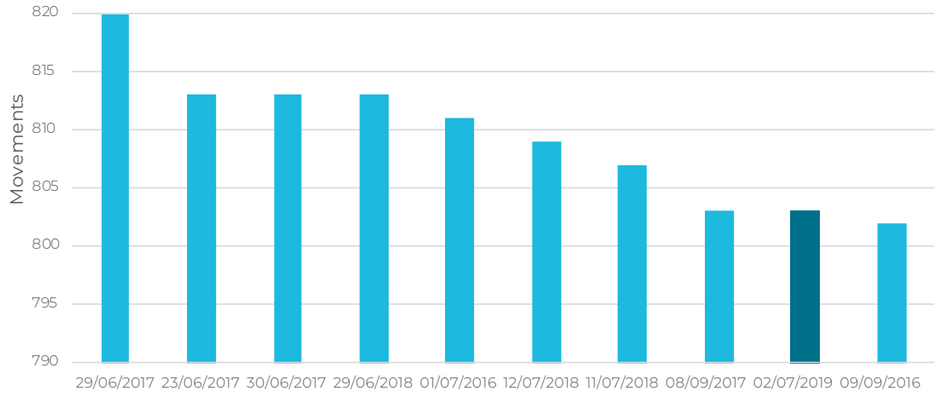


Figure 1-3: Ten days with highest amount of traffic since 2016

Quiet days

As shown in Figure 1-4 below, the ten days with the lowest amount of traffic in 2019 occurred in winter, between December and March. The day with least traffic was the 13th of February, with 20 movements: 17 arrivals and three (3) departures.
On that day, commercial air traffic in Belgian airspace was restricted, due to a day of industrial action at the national level.

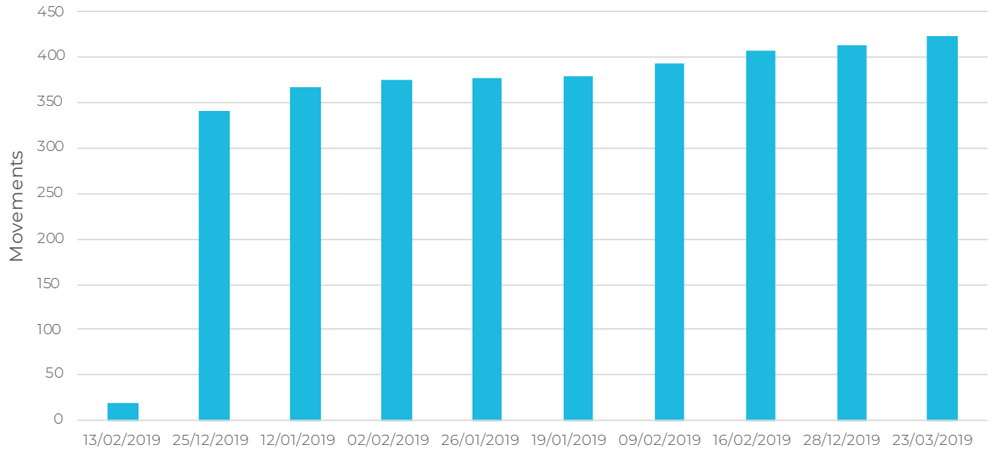


Figure 1-4: Ten days with lowest amount of traffic in 2019

Traffic patterns

Figure 1-5 shows the average traffic in winter and summer throughout the hours of the day over the period from 2016 to 2019. This chart confirms aforementioned: Brussels Airport is busier during the summer period – from April to September – than in winter. The daily patterns are similar for both periods, with traffic peaks between 08:00 and 10:00 and later between 19:00 and 21:00 Local Time (LT).

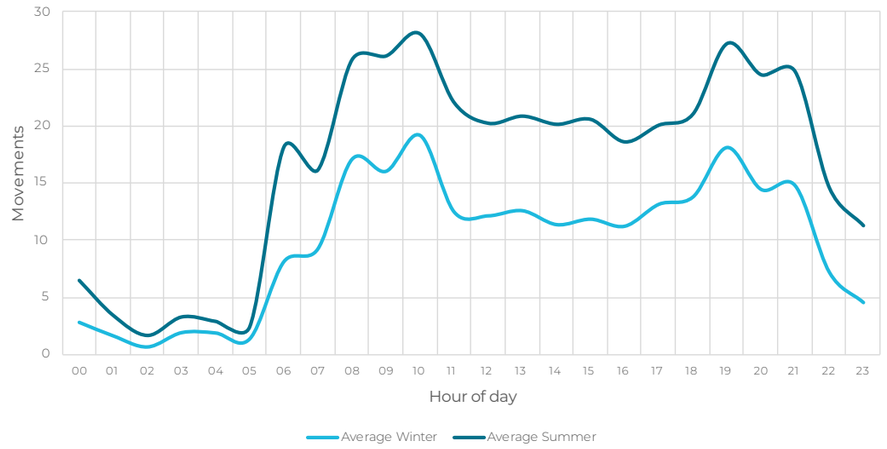


Figure 1-5: Average hourly movements in winter and summer for the period 2016-2019 (LT)

The traffic pattern at Brussels Airport can also be decomposed per day of the week, as shown in Figure 1-6. From Monday to Friday, the traffic is similar and these days therefore grouped in the graph. On these days, the two busy periods of the day mentioned above can be easily identified.

On Saturdays, the morning peak still appears, while traffic progressively decreases during the rest of the day. On Sundays, the morning peak is again visible, though to a reduced extent, while the traffic increases again to peak during the afternoon as on a week day.

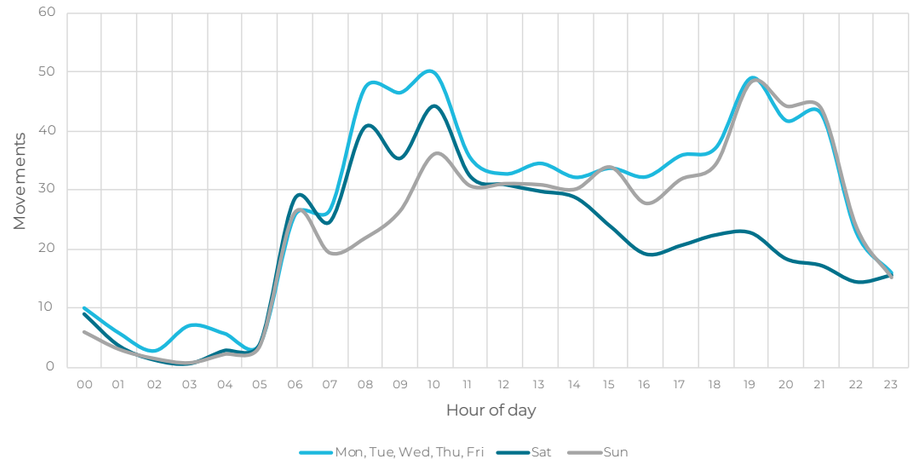


Figure 1-6: Average hourly movements per weekday for the period 2016-2019 (LT)

Considering night hours as the period between 23:00 and 06:00 local time, the distribution of movements over day and night is provided in Figure 1-7.

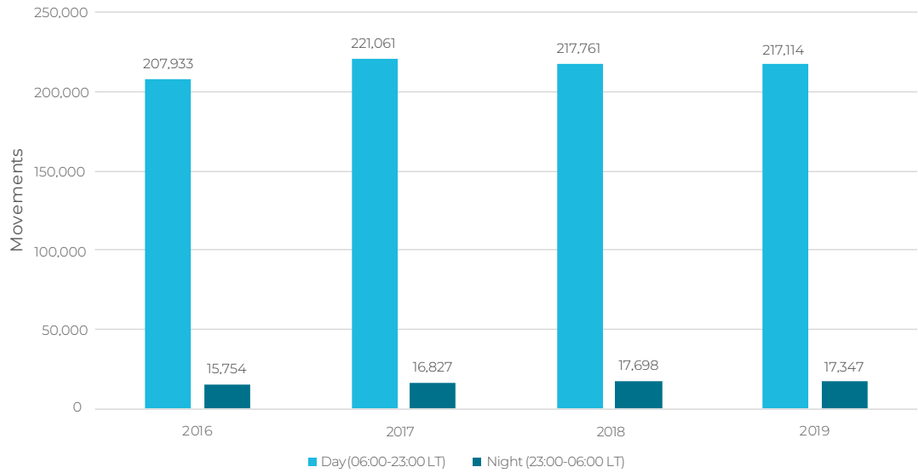
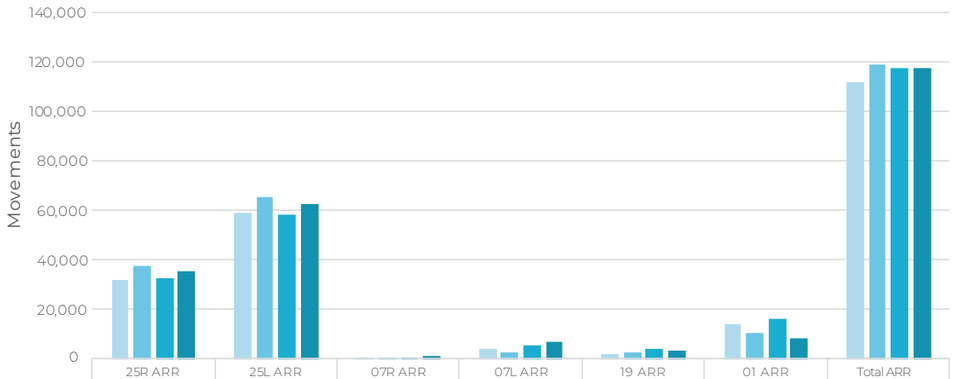


Figure 1-7: Total movements per day and night per year

Note that further details about night movements are provided in Chapter 4 of this report, as these are monitored as part of the noise reduction measures applicable at the airport.

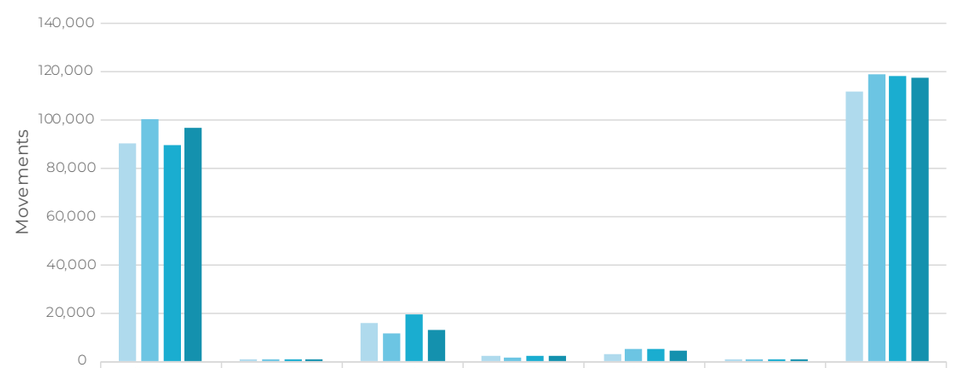
Runway use

The use of one runway configuration over another depends on several factors that must be considered, which are presented in Chapter 4. Figure 1-8, Figure 1-9 and Figure 1-10 show the runway use at Brussels Airport, divided between arrival and departure movements. Though the general orders of magnitude of runway use have remained the same over the past four years, arrivals on RWY 01 decreased by 50% and an increase in departures of 180% is to be noted in 2019 compared to 2018. Runways 07R and 07L have been used more and more for arrivals over the years, but less for departures.



	25R ARR	25L ARR	07R ARR	07L ARR	19 ARR	01 ARR	Total ARR
2016	32,134	59,259	419	4,189	2,058	13,788	111,847
2017	37,792	65,555	269	2,451	2,464	10,409	118,940
2018	32,888	58,444	734	5,445	3,921	16,295	117,727
2019	35,448	62,399	1,176	6,640	3,385	8,185	117,233

Figure 1-8: Number of arrivals per runway per year



	25R DEP	25L DEP	07R DEP	07L DEP	19 DEP	01 DEP	Total DEP
2016	90,203	141	16,047	2,237	3,149	63	111,840
2017	100,501	138	11,397	1,752	5,114	46	118,948
2018	89,623	143	19,757	2,781	5,352	76	117,732
2019	96,697	122	13,202	2,544	4,450	213	117,228

Figure 1-9: Number of departures per runway per year

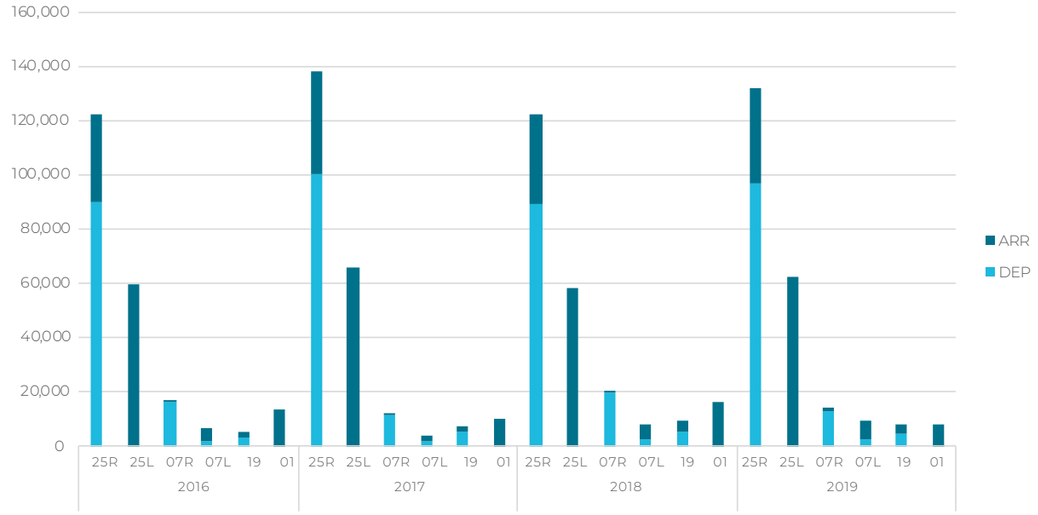
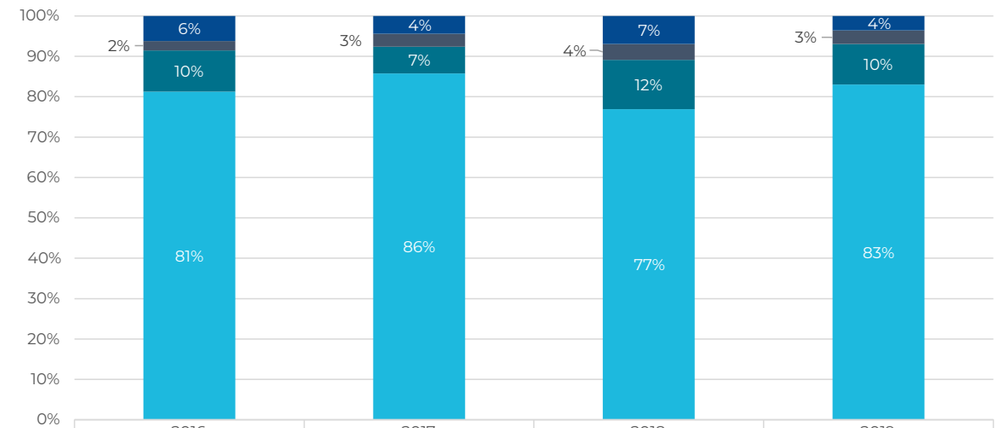


Figure 1-10: Movements per runway per year

The runway use by compass bearing, or orientation – 250° (West)-southwest , 070° (East-northeast), S - 190° (South), 010° (North) – is presented in Figure 1-11 below. It can be seen that the orientation 250° is mainly use. It is in accordance with the Preferential Runway System (PRS), presented in Chapter 4, where RWY 25R is usually used for take-offs, and both RWY 25L and 25R for landings.



	2016	2017	2018	2019
01	13,851	10,455	16,371	8,398
19	5,207	7,578	9,273	7,835
07L/R	22,892	15,869	28,717	23,562
25L/R	181,737	203,986	181,098	194,666

Figure 1-11: Runway use by orientation per year

2. SAFETY

This chapter highlights two topics: runway incursions and missed approaches. The runway incursions are a lagging runway safety indicator and are mandatory to be reported. Missed approaches are not mandatory to be reported but are reported on a voluntary basis. As such the quality and accuracy of the available information is commensurate with the level of reporting.

Missed approaches do not represent safety incidents. They are an operational solution allowing to maintain safety margins when the approach cannot be continued for a safe landing. At the same time, particularly during peak hours at busy airports, they also increase the traffic complexity and the residual safety risk.
One could argue that missed approaches are a hybrid leading indicator, and that by analysing the reasons leading to this type of procedure, we can examine if there are any systemic deficiencies in a technical equipment, in a procedure or in a way Air Traffic Control Officers (ATCOs) and/or pilots apply these procedures.

Missed Approaches

Missed approaches are performed according to published procedures, under the instructions of the air traffic controller or they are initiated by the pilot when the approach cannot be continued for a safe landing. Besides the discomfort for passengers and crew, the missed approaches increase the air traffic management complexity. The number of missed approaches and particularly their cause can therefore indicate which measures are to be taken to improve the safety of air navigation service provision.

The number of missed approaches at Brussels Airport is monitored on a weekly basis. Missed approaches are closely followed by skeyes' safety unit and investigations are conducted to identify root causes and implement improvement measures.

An overview of the missed approaches recorded at EBBR in 2019 is given in Figure 2-1, followed by tables and charts showing the evolution of missed approaches at Brussels Airport over the four previous years, and details per runway.

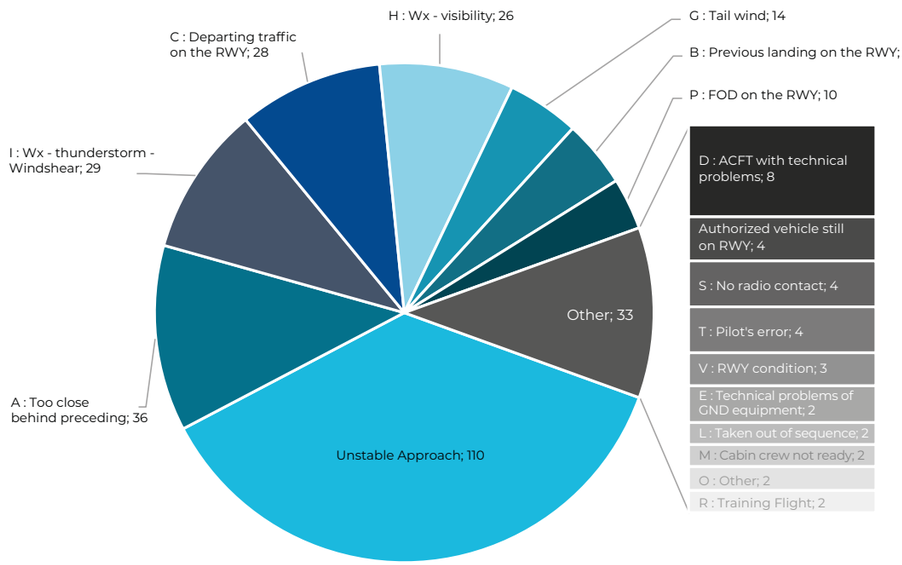


Figure 2-1: Missed approaches in 2019 per cause

Observing the rates of missed approaches per runway (Figure 2-2), discrepancies can be seen between the most commonly used runways and the others. Lower rates can be observed on RWY 25L and 25R where most of the arrivals take place (83.4% of all arrivals in 2019, see Figure 1-8). The low number of arrivals on the other runways imply that variations in the absolute numbers of missed approaches on these runways have a bigger impact on the rate.
A look into the causes per runway therefore becomes necessary to understand the discrepancies.

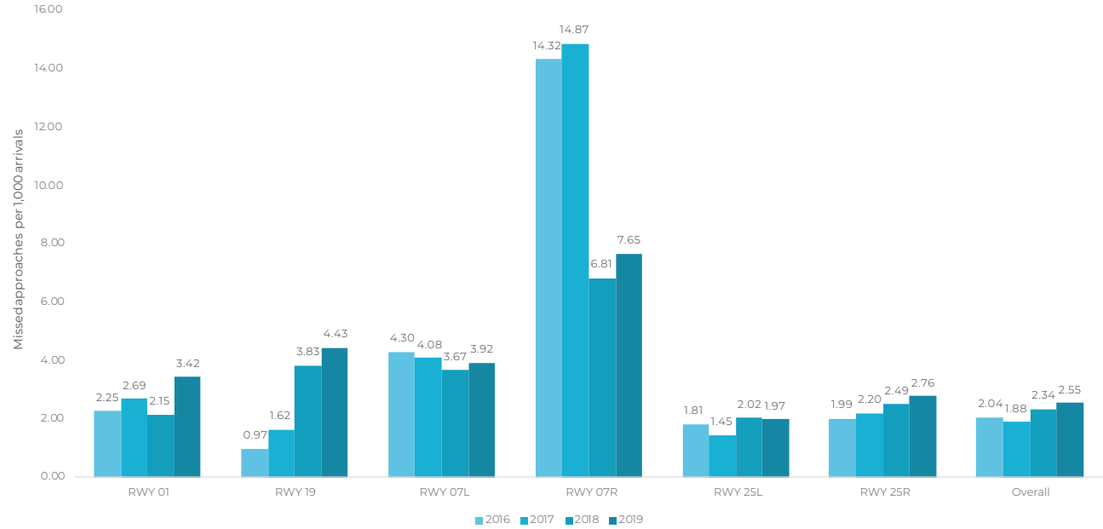


Figure 2-2: Missed approaches per 1.000 arrivals, per year

Missed approaches per runway

All missed approaches are recorded by cause of event, and the reporting is done by the ATCOs. Table 2-1 shows the main causes for each runway, i.e. the causes responsible for more than 90% of missed approaches in 2019. The frequency that these five reasons caused missed approaches in the previous 3 years is also shown, e.g. the top 5 reasons for missed approaches on RWY 01 in 2019 cover 49% of all reasons for missed approaches in 2018 and 57% in 2017 on that same runway.

Overall, 2019 has seen an increase in terms of missed approaches. Even though the number of arrivals has remained at the same level as in 2018, an increase of 8.9% in the number of missed approaches per 1000 arrivals has been registered. This corresponds to 24 more missed approaches in 2019.

The number of missed approaches caused by weather phenomena, visibility, has decreased if compared to 2018. It does not appear in the top 5 causes except for 25R and 25L, explaining the percentage discrepancy of top five causes with 2018 for these other runways.

Top 5 causes in 2019 RWY 01 Total missed approaches	2016 31	2017 28	2018 35	2019 28
Unstable Approach	17	11	12	18
A : Too close behind preceding	4	2	4	7
C : Departing traffic on the RWY	1	1		1
D : ACFT with technical problems	3	1		1
G : Tail wind		1	1	1
part top 5 causes of 2019	81%	57%	49%	100%

Top 5 causes in 2019 RWY 19 Total missed approaches	2016 2	2017 4	2018 15	2019 15
I : Wx - thunderstorm - Windshear	2	3	2	6
A : Too close behind preceding				3
Unstable Approach			3	3
V : RWY condition				2
E : Technical problems of GND equipment				1
part top 5 causes of 2019	100%	75%	33%	100%

Table 2-1:
Main causes for missed approaches

Top 5 causes in 2019 RWY 07L Total missed approaches	2016 18	2017 10	2018 20	2019 26
Unstable Approach	9	4	6	12
A : Too close behind preceding	1	2	3	4
B : Previous landing on the RWY	2	1	1	4
P : FOD on the RWY				2
Authorized vehicle still on RWY				1
part top 5 causes of 2019	67%	70%	50%	88%

Top 5 causes in 2019 RWY 07R Total missed approaches	2016 6	2017 4	2018 5	2019 9
B : Previous landing on the RWY	2	3	3	4
A : Too close behind preceding				2
I : Wx - thunderstorm - Windshear				1
S : No radio contact				1
Unstable Approach		1		1
part top 5 causes of 2019	33%	100%	60%	100%

Top 5 causes in 2019 RWY 25L Total missed approaches	2016 107	2017 95	2018 118	2019 123
Unstable Approach	47	41	58	49
I : Wx - thunderstorm - Windshear	9	12	16	18
A : Too close behind preceding	6	6	11	15
H : Wx - visibility	10	7	9	11
G : Tail wind	8	5	8	8
part top 5 causes of 2019	75%	75%	86%	82%

Top 5 causes in 2019 RWY 25R Total missed approaches	2016 64	2017 83	2018 82	2019 98
Unstable Approach	14	18	27	27
C : Departing traffic on the RWY	22	30	19	25
H : Wx - visibility	3	7	3	14
P : FOD on the RWY	6	1	5	6
A : Too close behind preceding	2	2		5
part top 5 causes of 2019	73%	70%	66%	79%

On runways 01 and 19, missed approaches caused by unstable approaches and an aircraft being too close behind preceding have increased in 2019, as have missed approaches due to windshear on RWY 19. The use of these runways is not nominal, and very often linked to unstable weather conditions which do not allow the use of the preferential runways 25R and 25L (only on Sundays RWY 19 is used for landings in the PRS – see Figure 4-1). In these weather conditions, missed approaches are more frequent.

On runway 07L, the number of missed approaches caused by unstable approaches has doubled (six more in absolute numbers). This could be attributable to the equipment available on that runway, with a VOR approach offset with respect to the runway centreline.

Similarly to what was observed for RWY 01 and 19, missed approaches due to an aircraft being too close behind preceding have also increased.

“Previous landing on the runway” has remained the top cause for missed approaches on 07R. This is likely to be linked in part to the absence of a taxiway at the end of runway 07R allowing fast exits.

For runways 25R and 25L, missed approaches due to being too close behind preceding have also increased. The safety unit recommends performing a survey on the topic to investigate possible mitigations to this increase. Among others, working procedures with the Approach unit (APP) should also be looked at to be further optimized.

On runway 25R, many missed approaches are caused by the runway unavailability due to the presence of departing traffic on the runway. The operational reason behind this is the bottleneck in departure capacity created by favouring airline requests: as landing on 25R implies shorter taxi times, airlines tend to request this runway for landings. This can result in insufficient slots to allow departures on 25R. As 25L is not considered to be a departure RWY in the preferential runway system (the lack of a taxiway to the runway threshold requires a backtrack for departures to take place, which takes time), too little slots may end up being allocated to departures during peak landing periods.

Recommendations

To diminish the number of missed approaches due to an unstable approach, skeyes advises the implementation of precision approaches: installation of an ILS on RWY 07L and permanent publication of RNP approach procedures with vertical guidance for runways 07L and 07R.

It is recommended to conduct a survey on the missed approaches caused by an aircraft being too close behind the preceding, and to involve both Approach and Tower unit.

Lastly, in order to avoid missed approaches caused by the presence of departing traffic on the runway, a discussion with airlines and both Approach (APP) and Tower (EBBR) units would be beneficial.

Runway incursions

According to ICAO Doc 4444 – PANS–ATM, a Runway Incursion (RI) is defined as “Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft”.

It should be noted that this ‘incorrect presence’ may be a consequence of a failure of a pilot or vehicle driver to comply with a valid ATC clearance or their compliance with an inappropriate ATC clearance.

Runway incursions are mandatory to be reported as per EU 2015/1018. Moreover, in accordance with EU 2019/317, all RIs need to be reported using the severity classification based on the Risk Analysis Tool (RAT).

According to this scheme, RIs are classified based on their severity in the following categories:

- A – Serious Incident, a collision was narrowly avoided.
- B – Major Incident, separation decreases and there is a significant potential for collision, which may result in a time critical corrective or evasive response.
- C – Significant Incident, an incident characterized by ample time and/or distance to avoid a collision.
- D – Not Determined, an incident that meets the definition of runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.
- E – No Safety Effect.
- N – No ATM contribution (i.e. no system, procedure or person involved in the provision of ATC services initiated or contributed to the incident).

This indicator includes:

- The overall number of runway incursions;
- The overall number of runway incursions in which skeyes had an ATM Ground contribution, classified according to the incident’s severity from A to E as described above;
- The overall number of movements in the corresponding period.

Continuous drop in runway incursion rates

A monthly overview of the runway incursions in 2019 can be seen in Figure 2-3. In total there were seven runway incursions of which one had an ATM contribution. The six runway incursions without ATM contribution were the following: three occurrences were caused by an aircraft passing the holding point without permission, one occurrence during which an aircraft took off without a clearance, one caused by a vehicle passing the holding point without permission and one caused by a vehicle crossing the runway without a clearance.

The graph below shows one runway incursion with ATM contribution in January which has been categorized as severity E, meaning no immediate safety effect, in the subcategory: an aircraft was incorrectly cleared to land. Landing clearance was given when another aircraft crossing the runway was just past the runway edge. The crossing aircraft was requesting to cross runway 25L for a high-power engine test during de-icing procedures. Measures were taken to create a gap of 12 NM between two arrivals. However, due to the long time it takes for especially heavy traffic to cross runway 25L when on tow, initial coordination was unsuccessful. The landing aircraft was informed about the aircraft on tow crossing the runway and reported visual with the traffic at a certain time.

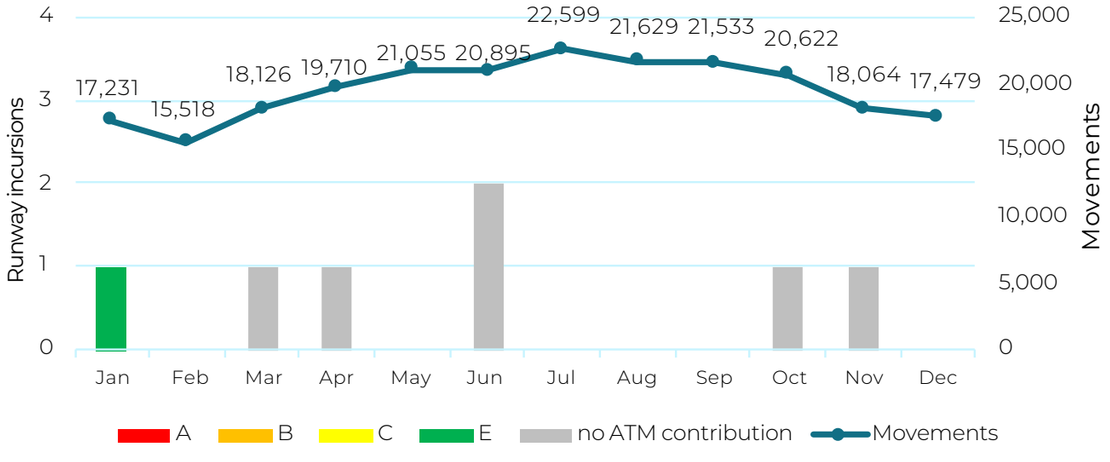


Figure 2-3: Runway incursions 2019, per month, per category

Figure 2-4 gives a yearly overview of the runway incursions for the period from 2016 until 2019.

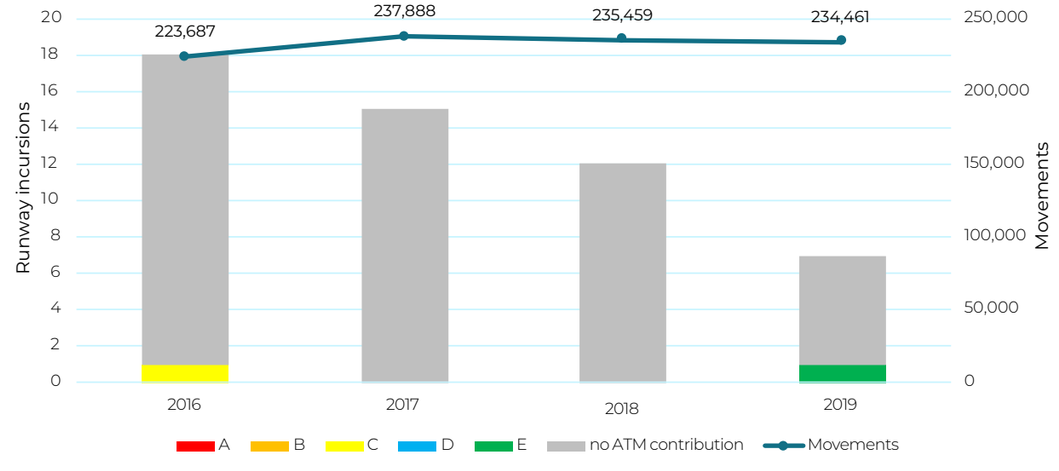
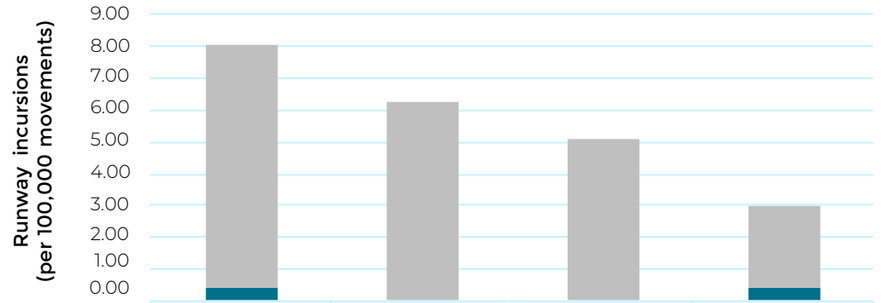


Figure 2-4: Runway incursions 2016-2019, per year, per category

Rather than comparing absolute numbers, looking into the rate of runway incursions is more accurate for a comparison over the years. Figure 2-5 shows the rate per 100,000 movements for Brussels Airport for the years 2016 until 2019. In the past four years the rate of total runway incursions has significantly decreased.



	2016	2017	2018	2019
no ATM contribution per 100,000	7.60	6.31	5.10	2.56
ATM contribution per 100,000	0.45	0.00	0.00	0.43

Figure 2-5: Rate of runway incursions per 100,000 movements 2016-2019, per year

3. CAPACITY & PUNCTUALITY

This chapter is divided into two sections. In the first section, the airport capacity is addressed. The declared capacities for different runway configurations are given and analysed, taking as reference the number of movements during peak hours in the busiest month.

In the second section, the punctuality (arrival delay) at EBBR is studied. skeyes has targets to comply to regarding delays attributable to the Air Navigation Service Provider (ANSP) caused by regulations placed at the airport on arrivals. The delay is also analysed from the airport's point of view, i.e. considering the impact caused by regulations not only at EBBR, but also in the Belgian en-route airspace and by other ANSPs.

Airport Capacity

A performance indicator for airports is the throughput capacity and its utilisation. The throughput capacity of an airport is influenced by several factors, e.g. airport layout, weather, fleet mix, ATC procedures, etc.

To better understand the following section, some definitions are given first:

Capacity

Aerodrome capacity is the estimated number of total operations that a given aerodrome configuration can handle in a given period and under a given set of assumptions, which are fleet mix, separation minima rules, weather conditions and technological aids.

Maximum Throughput (or Saturation) Capacity

Maximum Throughput Capacity (MCT) is the fundamental measure of the runway system's capacity. MCT defines the average number of movements (arrivals and/or departures) that can be performed on the runway system in one hour. Following assumptions are made:

- There is a continuous supply of arrivals and/or departures.
- Air Traffic Control rule - no Simultaneous Runway Occupancy (SRO).
- Air Traffic Control rule - safe Wake Vortex Separation Distances between two flights.
- Static fleet mix (i.e. types of aircraft do not change).
- Approach and departure procedures do not change.

Consequently, MCT is a theoretic measure of runway capacity and is represented as an average capacity for the runway system.

Declared Capacity

Declared capacity is the capacity per hour used to determine the number of slots available for schedule coordination purposes.

For the declared capacity of 2019, the figures of 2018 were taken, as the assumptions and conditions did not change.

For Brussels Airport, the declared capacities for each runway threshold have been calculated as being 90% of the theoretical MCT. For the calculations of the MCT, on top of the above-mentioned assumptions, the following was considered:

- The fleet mix of the busiest month in 2018 is taken as reference.
- A nominal radar separation of 3NM is considered.
- A loss factor of 15% is considered for inter arrival times.
- The average runway occupancy time for arrival (ROTA) is based on an analysis of the characteristics of the aircraft landing at EBBR during August 2018.
- The average approach speed is 145 knots (based on measurements).
- The average headwind differs per runway.
- The inter departure time is a function of the time to reach an altitude after being cleared for T/O.

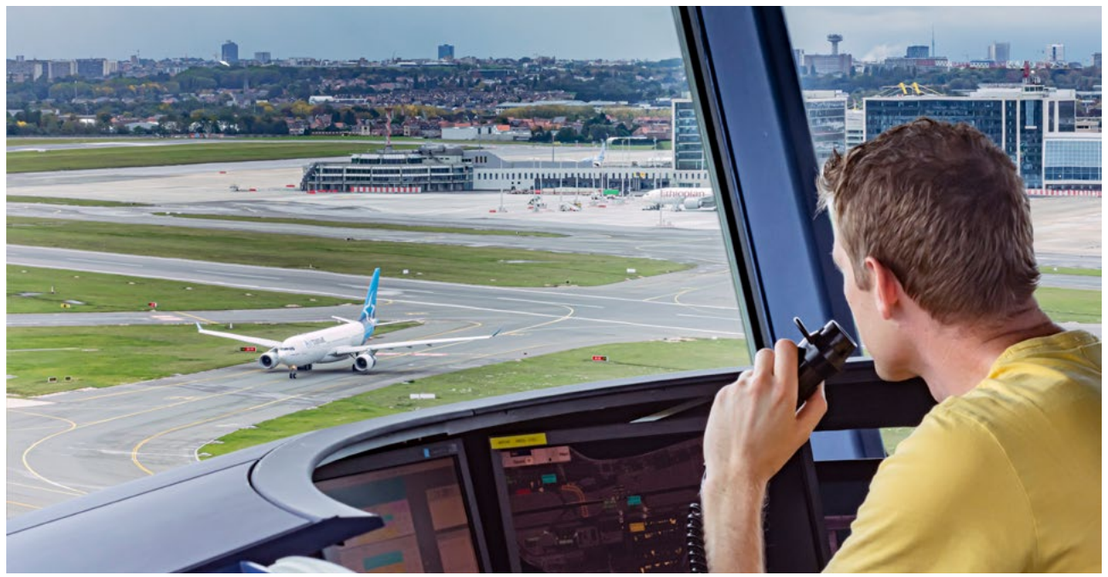
Table 3-1 shows the declared capacities depending on the runway configurations at Brussels Airport.

Table 3-1: Declared IFR capacity

Runway configuration	Runway		Declared Capacity		
	DEP	ARR	DEP	ARR	MVT
RW01	01	01	38	33	40
RW19	19	19	38	33	39
RW07L	-	07L	-	32	32
RW07R	07R	-	34	-	34
RW25L	-	25L	-	34	34
RW25R	25R	25R	41	34	41
RW01-07R-07L	07R-07L	01	34	27	54
RW25L-25R	25R	25L+25R	41	68	75
RW25R-19	25R+19	25R	35	34	45

Details for the month of July, the busiest month of the year, are presented below. Figure 3-1 shows the number of arrivals and departures, along with the runway configuration and the resulting declared capacity for the peak hour of each day of the month. A peak hour is determined on a 15 minutes floating basis.

The monthly overview of the year can be found in Annex 1.



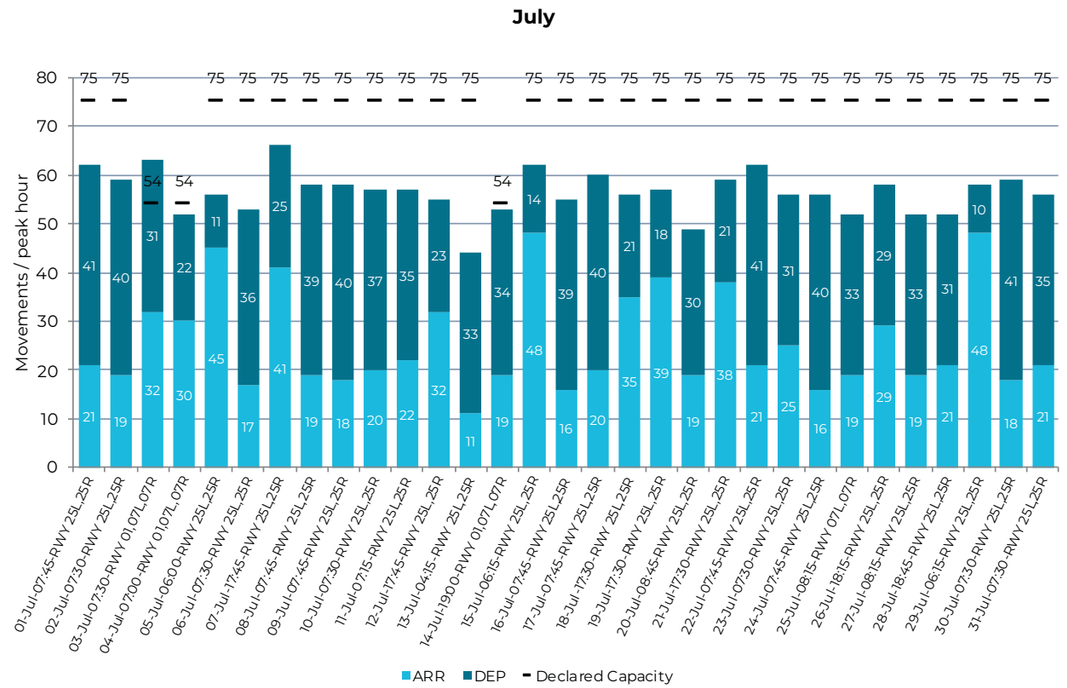


Figure 3-1: Arrivals, departures and declared capacities during peak hours in July 2019

The declared capacity was exceeded once on the 3rd of July. On that day, the runway configuration was 01-07L-07R, due to meteorological conditions at the airport not permitting the PRS to be used, and the capacity was exceeded by nine movements.

The highest traffic peak occurred on the 14th of October, with 68 movements (Annex 1), which remained below the declared capacity of 75 of the runway configurations in use at the time.

Over the year, the declared capacity was exceeded during peak hour in seven occurrences, by an average of 6.3 movements. On all these seven days, the runway configuration was 01-07L-07R, adapted to the weather conditions. On average in 2019, the traffic at peak hours was 18.9 movements below the declared capacity.

Figure 3-2 shows the days in which the declared capacity was exceeded or almost reached. It can be noticed that during peak hours, the capacity limit is exceeded if ATC cannot use runways 25L and 25R. In all those cases, runways 25L and 25R were not available due to meteorological conditions.

Figure 3-2: Days that exceeded or almost reached the declared capacity - 2019

Figure 3-1 presented above may give a misleading impression that demand is well below the available capacity if runways 25L and 25R are in use. An overview of "what could have been" is given in Figure 3-3. Dark and light blue colours show the actual traffic, whilst other colours represent the available slack capacity, meaning how much more traffic and more importantly, which kind of traffic, could have been handled on those days.

Since the capacity depends on the ratio of arrivals and departures, the slack capacity can be calculated and could be used for:

- Arrivals only: yellow. Represents the number of 'additional' arrivals that could have been handled during the peak hours;
- Departures only: red. Represents the number of 'additional' departures that could have been handled during the peak hours;
- And arrivals and/or departures: green. Represents the number of 'additional' arrivals or departures that could have been handle during the peak hours.

Figure 3-3: Theoretical analysis of the remaining capacity - July 2019

On the 3rd, 4th and 14th of July, the capacity limits were reached, or almost, due to the use of runways 01, 07L and 07R, where the capacity is at 54 movements per hour. Therefore, little or no slack capacity could be calculated.

On the other hand, it can be noticed that arrivals are not a problem for runway configuration 25L-25R.

A different observation can be made for departures: for example, on the 10th of July, four more departures could have been handled, representing the maximum additional departures that could have happened during peak hours. An operational explanation for this is the effort made to offer airlines with shorter taxi times by giving them a landing clearance on 25R rather than 25L. This can result in insufficient slots to allow departures on 25R. As 25L is not considered to be a departure RWY in the preferential runway system (the lack of a taxiway to the runway threshold requires a backtrack for departures to take place, which takes time), this RWY lacks capacity.

Punctuality

Punctuality is a service quality indicator from a passenger perspective. This section observes one of the factors that influences the punctuality: ATFM (Air Traffic Flow Management) delay. ATFM delay is defined as the time difference between estimated take-off time (ETOT) and calculated take-off time (CTOT) of the NM (Network manager, EUROCONTROL) and is due to ATFM measures that are classified according to the respective causes listed below:

- A - Accident
- C - ATC Capacity
- D - De-icing
- E - Equipment (non-ATC)
- G - Capacity Aerodrome
- I – Industrial Action (ATC)
- M - Airspace Management
- N – Industrial Action (non-ATC)
- O - Other
- P - Special Events
- R - ATC Routing
- S - ATC Staffing
- T - Equipment (ATC)
- V - Environment
- W - Weather
- NA - Not Specified.

According to the FABEC Performance Plan the causes with ANSP contribution are (in the order listed in the Performance Plan):

- C – ATC Capacity
- R – ATC Routeing
- S – ATC Staffing
- T - Equipment (ATC)
- M - Airspace Management
- P - Special Event.

Hence, in the remainder of the report all causes with ANSP contribution are referred to as “CRSTMP” while “Other Categories” aggregates all categories but CRSTMP and W (weather).

The discussion in this part is about the regulated traffic at Brussels Airport where the first part considers the key performance indicator: arrival delay, the delay of a flight due to a regulation placed by the airport of arrival. In addition, this section gives an overview of the influence of ATFM measures on departing traffic followed by an overview of the influence of ATFM measures on arriving traffic.

Airport arrival ATFM delay per flight

As of January 1st, 2015, skeyes is subject to an annual target regarding ATFM arrival delay. ATFM arrival delay is the delay of a flight due to a regulation from the destination airport. The target is defined as an average arrival delay per flight, as defined in the FABEC Performance Plan, §3.1. (C). (ii), which is in accordance with the European Performance Regulation (EU) No 390/2013, Annex 1, Part 2, §3.1 (b). Targets are set on a national level and on an airport level. The national target is the aggregation of the airport targets and the target is 0.10 min/flight for the years 2016 until 2019. On an airport level, targets are set for Brussels Airport and Liège airport. The target for Brussels Airport on CRSTMP arrival delay is 0.12 min/flight for 2016 and 0.11 min/flight for the years 2017 until 2019.

For this performance indicator, a comparison is made over the past four years. Table 3-2 gives the arrival delay at Brussels Airport and the total number of arrivals per year. Note that the number of arrivals in this section and the arrival delay for each flight is calculated by the NM and has been provided by the Performance Review Unit (PRU/ EUROCONTROL)[2] . Weather, as in 2018, is the main reason for regulations that caused delay for arriving aircraft. A decrease is seen in the delay due to CRSTMP measures.

Table 3-2: Number of arrivals and arrival delay at Brussels Airport for 2016-2019, per year, per cause

Year	#Arrivals	Arrival delay (min)			
		CRSTMP	Weather	Other categories	Total
2016	107,142	**12,012**	81,283	7,868	101,163
2017	116,545	**15,991**	68,484	9,973	94,448
2018	114,996	**9,140**	86,027	2,952	98,119
2019	114,941	**8,913**	7,6127	18,267	103,307

As mentioned before, the key performance indicator (KPI) is the average CRSTMP arrival delay per arrival at the airport. Figure 3-4 gives the data for Brussels Airport for the period from 2016 until 2019.

The figure shows clearly that only in 2017 the target was not met for the arrival delay. For 2019, the amount of CTRSTMP arrival delay stayed below the target set for the airport. The national target for the aggregated arrival delay per flight for Brussels Airport and Liege airport, was met in 2019. The average arrival delay on a national level was 0.06 minutes per flight.

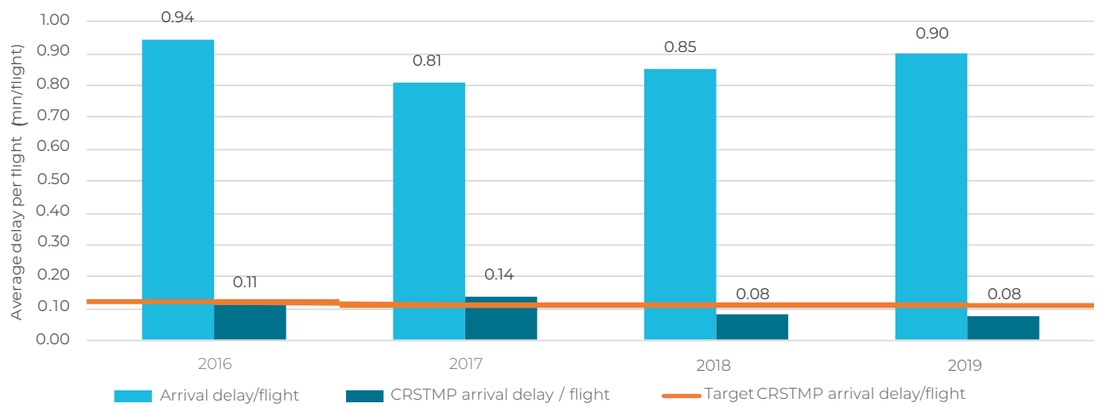


Figure 3-4: Arrival delay KPI at Brussels airport for 2016-2019, per year

[2] Hence the difference with figures in chapter 1, where movements are counted using the AMS and the BCAA criteria. NM only account for flights with a registered flight plan.

All ATFM delay affecting departures

Flights departing from an airport can be delayed by ATFM measures in any of the sectors they cross on their route. In 2019, 31,932 departing flights from Brussels Airport were delayed resulting in a total of 470,012 minutes of delay. 27.0% (127,023 minutes) of that delay is attributable to skeyes while 73.0% (342,989 minutes) is attributable to other ANSPs. Figure 3-5 shows delay due to skeyes and other ANSPs.

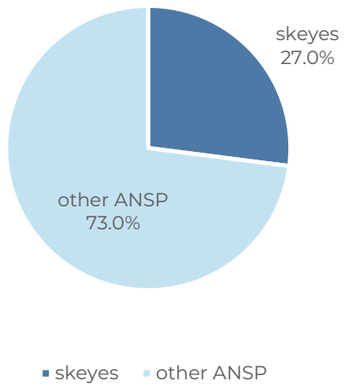


Figure 3-5: ATFM delay for departing flights attributable to skeyes and other ANSPs in 2019

To give a view of the severity of the impact, the delayed flights can be categorised based on the length of the delay. There are four categories:

- Between 1 and 15 minutes
- Between 16 and 30 minutes
- Between 31 and 60 minutes
- More than 60 minutes.

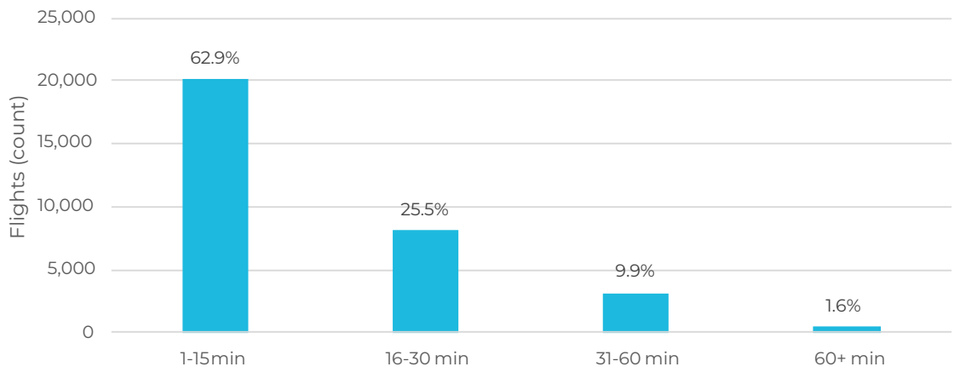


Figure 3-6: Delayed departing flights per category in 2019

The graph in Figure 3-6 shows that 62.9% of the delayed flights were delayed for a maximum of 15 minutes, and 98.4% of the delayed flights had a delay less than one hour.

All ATFM delay affecting arrivals

Flights arriving to an airport can be, just like departing flights, delayed by ATFM measures in ATC sectors on the flight plan (en-route delays) and arrival delays which are caused by ATFM measures at the airport of arrival. This section observes the delay of arriving traffic at Brussels Airport.
In 2019, 27,253 flights with destination Brussels Airport were delayed and experienced a total of 453,104 minutes of delay. 50.1% (227,104 minutes) of that delay is attributable to skeyes while 49.9% (226,000 minutes) is attributable to ATFM measures by other ANSPs. Figure 3-7 shows the ATFM delay attributable to skeyes and other ANSPs.

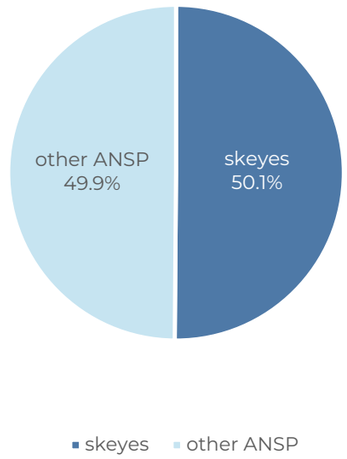


Figure 3-7: ATFM delay for arriving flights attributable to skeyes and other ANSPs in 2019

As for departures, delayed arrival flights can be categorised based on the length of the delay, considering four categories:

- Between 1 and 15 minutes
- Between 16 and 30 minutes
- Between 31 and 60 minutes
- More than 60 minutes.

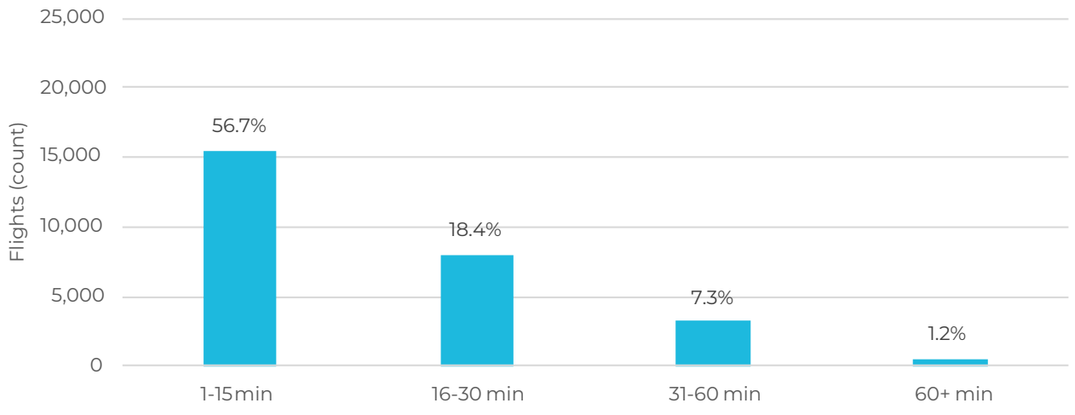


Figure 3-8: Delayed arriving flights per category in 2019

The graph in Figure 3-8 shows that the most of the delayed flights (56.7%) have been delayed with a maximum of 15 minutes, less than 10% of the flights were delayed more than 30 minutes and only 1.2% delayed more than one hour.

4. ENVIRONMENT

The first part of this chapter is dedicated to the runway configuration scheme in use at Brussels Airport. Because of its geographical location in a densely populated area, it is interesting for neighbouring communities to know which runways are in use. Besides the monthly and yearly overview of the use of the Preferential Runway System (PRS), the ongoing processes which ensure a continuous dialogue with all the stakeholders and a continuous improvement in the runway configuration choice are addressed. Because wind is a predominant factor in the choice of runway use, wind data is provided in this section.

The second part focuses on green landings, the so-called Continuous Descent Operations (CDO). The objective of CDOs is to reduce aircraft noise, fuel burn and emissions by means of a continuous descent, to fly the approach glide path at an appropriate altitude for the distance to touchdown. skeyes put in place indicators to monitor the use of CDOs, in collaboration with the other members of FABEC. Note that both PRS and CDO data can also be found on the Brussels Airport Traffic Control (BATC) website: www.batc.be .

As part of its noise reduction policy, Brussels Airport implements all the measures imposed by the government with a view to reducing noise pollution. This means that the number of night slots is limited. Night movements are therefore also shown in this chapter on Environment.

Preferential Runway System

The basic flight principle is that an airplane needs to take off and land windward. However, to choose the runway in use, skeyes must consider, in addition to the speed and surface wind direction, other factors such as environmental regulations, runway length, available navigation aids for approach and landing, the weather conditions and the available instrument approach procedures, or availability of runways and taxiways.

A Preferential Runway System (PRS) is in place at EBBR. This system defines the runways to be used depending on the time of the day, day of the week, wind conditions and more. When these conditions are not met, skeyes may choose a more suitable alternative runway configuration to maintain the safety of operations. The figure below shows the runway configuration scheme as listed in the Aeronautical Information Publication (AIP).

Figure 4-1: Runway Configuration Scheme as published in the Belgian AIP (Part 3, EBBR, AD 2.20, Ch. 4.2.1)

		0500 to 1459 (0400 to 1359)	1500 to 2159 (1400 to 2059)	2200 to 0459 (2100 to 0359)
MON 0500 (0400) till TUE 0459 (0359)	TKOF	25R		25R / 19 [1]
	LDG	25L / 25R		25R / 25L [2]
TUE 0500 (0400) till WED 0459 (0359)	TKOF	25R		25R / 19 [1]
	LDG	25L / 25R		25R / 25L [2]
WED 0500 (0400) till THU 0459 (0359)	TKOF	25R		25R / 19 [1]
	LDG	25L / 25R		25R / 25L [2]
THU 0500 (0400) till FRI 0459 (0359)	TKOF	25R		25R / 19 [1]
	LDG	25L / 25R		25R / 25L [2]
FRI 0500 (0400) till SAT 0459 (0359)	TKOF	25R		25R [3]
	LDG	25L / 25R		25R
SAT 0500 (0400) till SUN 0459 (0359)	TKOF	25R	25R / 19 [1]	25L [4]
	LDG	25L / 25R	25R / 25L [2]	25L
SUN 0500 (0400) till MON 0459 (0359)	TKOF	25R / 19 [1]	25R	19 [4]
	LDG	25L / 25R [2]	25L / 25R	19

[1] RWY 25R only for traffic via ELSIK, NIK, HELEN, DENUT, KOK and CIV / RWY 19 only for traffic via LNO, SPI, SOPOK, PITES and ROUSY; aircraft with MTOW between 80 and 200 T can use RWY 25R or 19 (at pilot discretion); aircraft with MTOW > 200 T shall use RWY 25R regardless the destination.

[2] Arrival on RWY 25L at ATC discretion only.

[3] No airport slot will be allocated for take-off between 0000 (2300) and 0500 (0400) (EBBR AD 2.20, ∫ 1).

[4] No airport slot will be allocated for take-off between 2300 (2200) and 0500 (0400) (EBBR AD 2.20, ∫ 1).

Note: The hours published in the AIP are in UTC:

- 05:00 to 14:59 in winter: 06:00 to 15:59 Local Time
- (04:00 to 13:59) in summer: 06:00 to 15:59 Local Time

The Runway Configuration Scheme is highly influenced by the weather

The figure below shows, per month in 2019, the percentage of time when the PRS was followed and the distribution per reason.

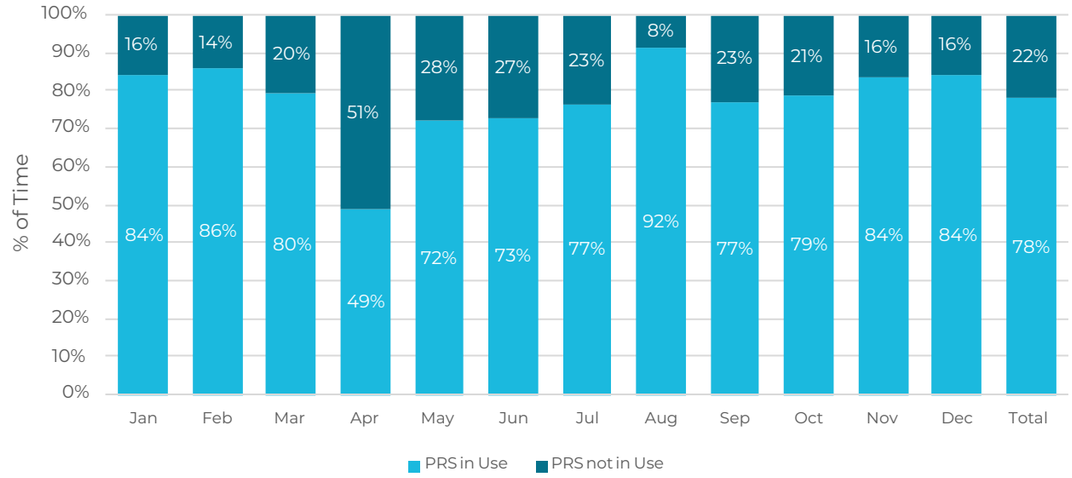


Figure 4-2: Monthly Overview of PRS Use 2019 (in time)

Table 4-1: Monthly Overview of non-Use of the PRS per Reason in 2019 (in time)

PRS in use / Reason PRS not in use configuration	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Meteorological conditions at the airport	58:43	41:10	95:48	291:31	129:30	129:33	130:31	25:18	96:13	107:30	90:09	89:44	1285:40
Meteorological conditions near the airport in the departure and/or approach path	7:19	9:42	6:02	67:31	60:01	6:44	16:08	-	8:37	4:45	10:02	11:19	208:10
Obstacles in the departure and/or approach path	2:29	-	19:22	-	-	11:40	-	-	-	-	-	-	33:31
Unplanned non-availability (U/S) of airport and/or ATC equipment	-	0:34	-	-	-	-	-	-	-	-	-	-	0:34
Plannes maintenance of airport and/or ATC aquipment	0:41	-	10:35	-	4:47	15:24	7:55	-	19:53	4:17	0:56	0:38	65:06
Traffic demand exceeds capacity of PRS	4:08	5:39	9:06	8:03	10:37	16:60	12:24	19:40	11:58	12:58	8:15	3:15	123:03
Non-availability RWY/TWY	44:11	31:14	11:09	1:30	-	13:01	4:08	17:49	27:23	26:04	3:11	1:27	181:07
Special activities	-	7:18	-	-	-	3:15	3:10	-	2:32	0:34	3:37	3:60	24:26
Other	-	-	-	-	0:11	-	-	-	-	0:40	0:25	7:00	8:16
PRS	626:29	576:23	592:58	351:25	538:54	523:23	569:44	681:13	553:24	586:12	603:25	626:37	6830:07

The PRS usage fluctuates throughout the year, however in April the meteorological conditions were the main cause for the low PRS use. In that month, the wind mainly came from the north-east, not allowing the use of runways 25L and 25R (Figure 4-7).

As expected, the meteorological conditions at/near the airport compose almost 80% of the reasons for the non-use of the PRS.

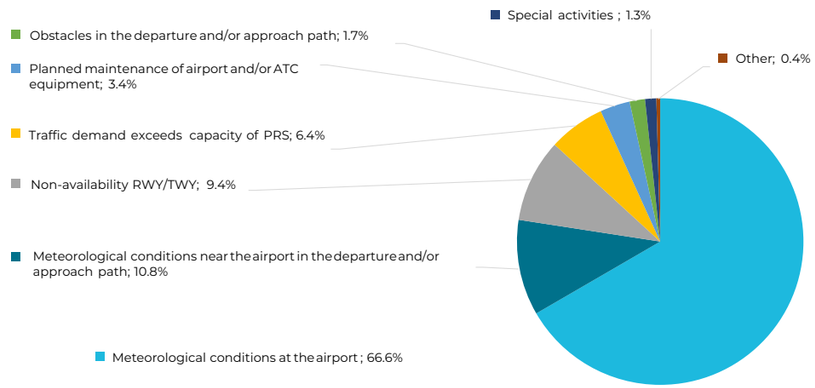
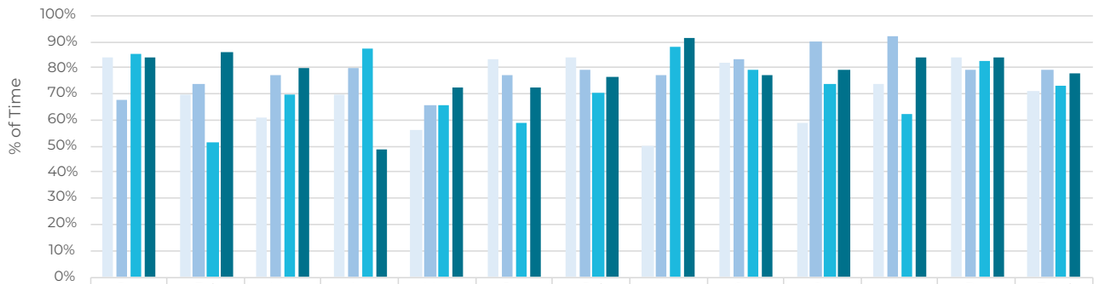


Figure 4-3: Reasons Distribution in 2019

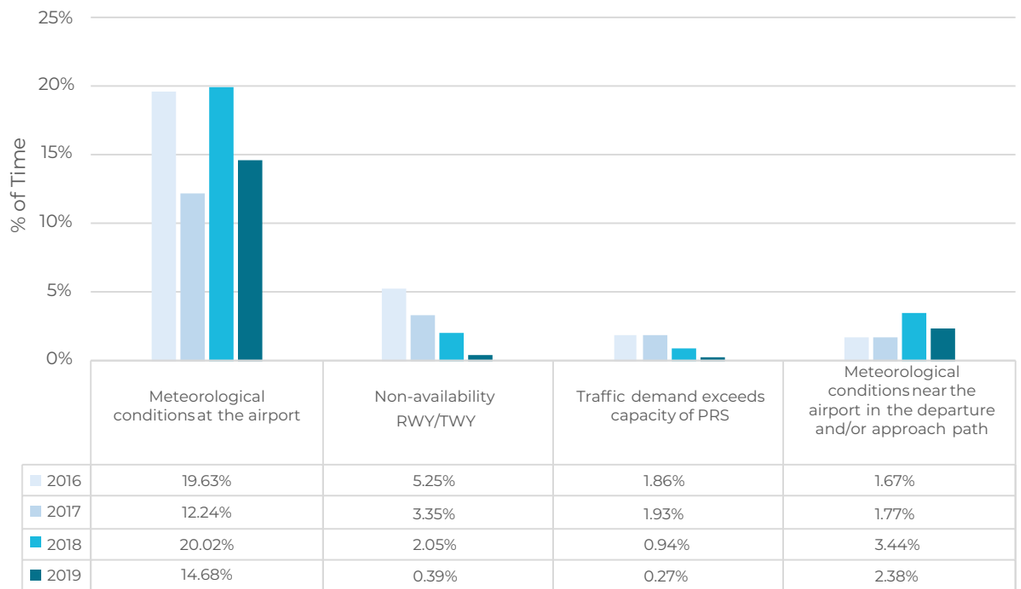
Comparison PRS (in time) 2016 – 2019

Figure 4-4 and Figure 4-5 compare the period from 2016 to 2019, in terms of the monthly use of the PRS and the non-use of the PRS by reason.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2016	84%	70%	61%	70%	56%	83%	84%	50%	82%	59%	74%	84%	71%
2017	68%	74%	77%	80%	66%	77%	79%	77%	83%	90%	92%	79%	79%
2018	85%	51%	70%	87%	65%	59%	70%	88%	79%	74%	63%	82%	73%
2019	84%	86%	80%	49%	72%	73%	77%	92%	77%	79%	84%	84%	78%

Figure 4-4: Use of the PRS: Comparison 2016 – 2019 (in time)



	Meteorological conditions at the airport	Non-availability RWY/TWY	Traffic demand exceeds capacity of PRS	Meteorological conditions near the airport in the departure and/or approach path
2016	19.63%	5.25%	1.86%	1.67%
2017	12.24%	3.35%	1.93%	1.77%
2018	20.02%	2.05%	0.94%	3.44%
2019	14.68%	0.39%	0.27%	2.38%

Figure 4-5: Evolution of Reasons for non-use of PRS 2016 – 2019 (in time)

The PRS was more used in comparison to 2018. During 2018, the usual wind pattern with dominant southwest winds was not observed.

Previous year showed a more “standard” pattern (similar to the patterns from 2016 and 2017), which is the main reason why the PRS could be more in use (see Figure 4-6).

More southwest winds in 2019

The wind pattern in 2019 shows an increase in the frequency of southwest winds. This dominance of southwest winds was also observed in 2016 and 2017, with 2018 being an exception.

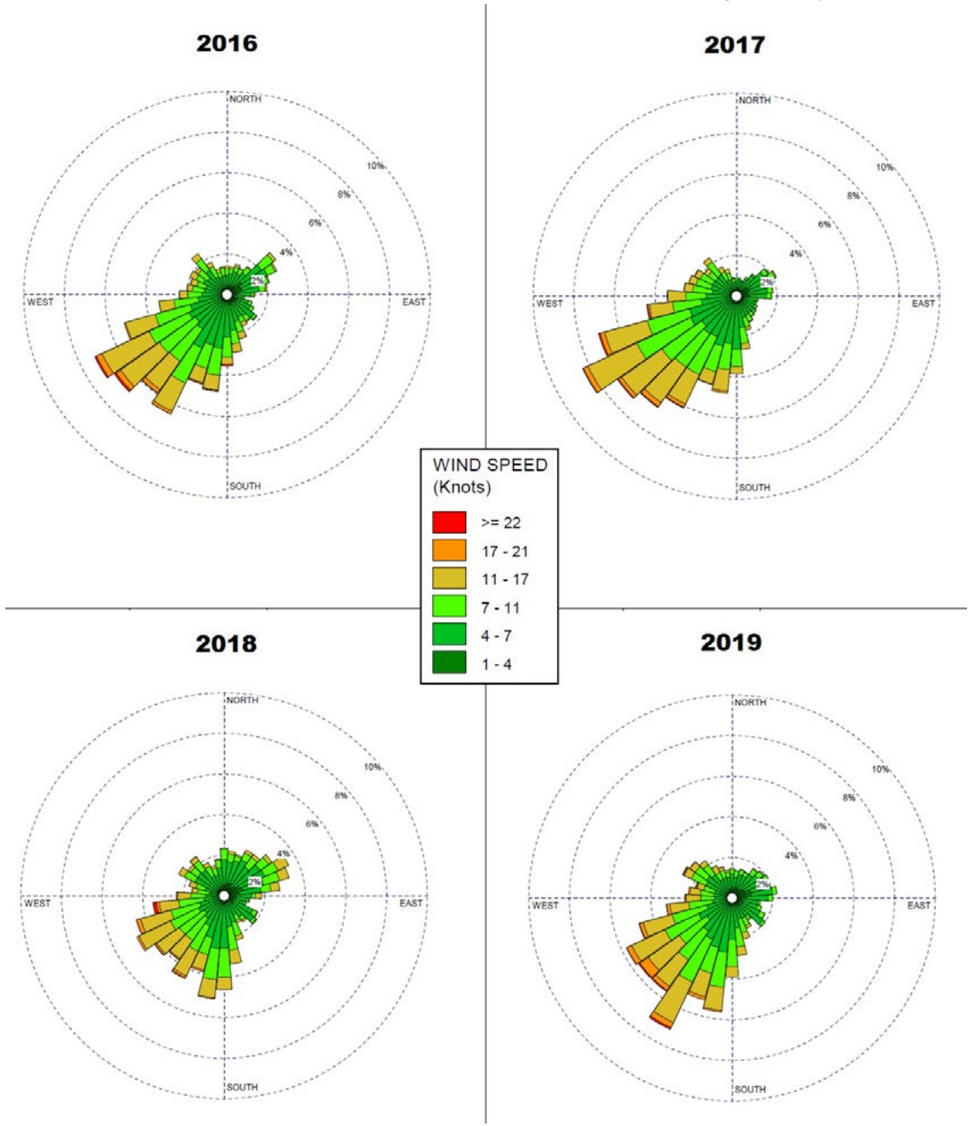


Figure 4-6: Wind roses EBBR 2016 – 2019

As can be seen in Figure 4-2, the PRS was less used in April, and runways 07L and 07R were more used. That happened due to the change in the wind direction, when it came exceptionally mainly from the northeast during that month.

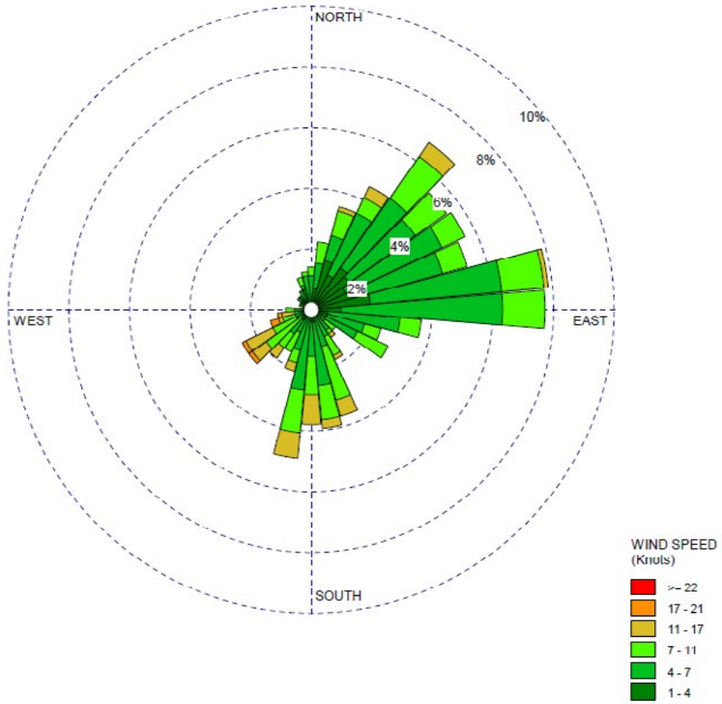


Figure 4-7: Wind Rose EBBR April 2019

Runway configurations used

Table 4-2 and Figure 4-8 below show the distribution of the runway configurations in percentage of time, and in comparison, with the previous four years.

Table 4-2: Duration of Runway Configurations Used at EBBR in 2019 (HH:MM)

RWY opened	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Total (%)
25L 25R	529:11	410:47	460:29	242:12	406:19	342:40	454:54	446:34	382:18	392:20	405:44	445:59	4919:27	**56.16%**
19 25L 25R	116:22	139:33	133:18	85:06	124:07	135:18	113:12	167:25	113:39	151:46	151:37	144:60	1576:23	**18.00%**
01 07L 07R	1:21	-	15:43	144:38	93:33	51:25	61:15	4:46	7:25	55:05	17:41	28:24	481:16	**5.49%**
07L 07R	13:22	11:51	9:12	164:14	35:14	59:17	26:48	16:27	53:20	34:22	51:28	-	475:35	**5.43%**
25R	36:31	35:21	37:29	17:27	16:08	40:17	37:25	47:12	59:39	43:32	31:38	27:60	430:39	**4.92%**
25L	28:22	28:52	34:30	19:06	26:60	32:60	24:05	26:13	26:36	26:31	27:51	27:60	330:06	**3.77%**
19	13:60	33:34	14:58	19:55	12:60	25:03	19:29	27:38	26:46	14:27	22:04	24:47	255:41	**2.92%**
19 25R	1:31	8:51	29:21	21:04	-	21:07	-	-	31:49	2:01	9:42	42:31	167:57	**1.92%**
01 07R	-	-	10:00	6:18	7:45	11:36	-	3:36	10:16	22:47	-	-	72:18	**0.83%**
01	-	-	-	-	10:46	-	3:52	-	-	-	-	1:19	15:57	**0.18%**
01 07L	-	0:50	-	-	9:27	-	-	-	-	-	-	-	10:17	**0.12%**
19 25L	2:44	-	-	-	-	0:17	3:00	3:35	-	-	0:29	-	10:05	**0.12%**
07L	0:24	-	-	-	-	-	-	-	8:12	-	-	-	8:36	**0.10%**
Total	**744**	**672**	**745**	**720**	**744**	**720**	**744**	**744**	**720**	**743**	**720**	**744**	**8,760**	

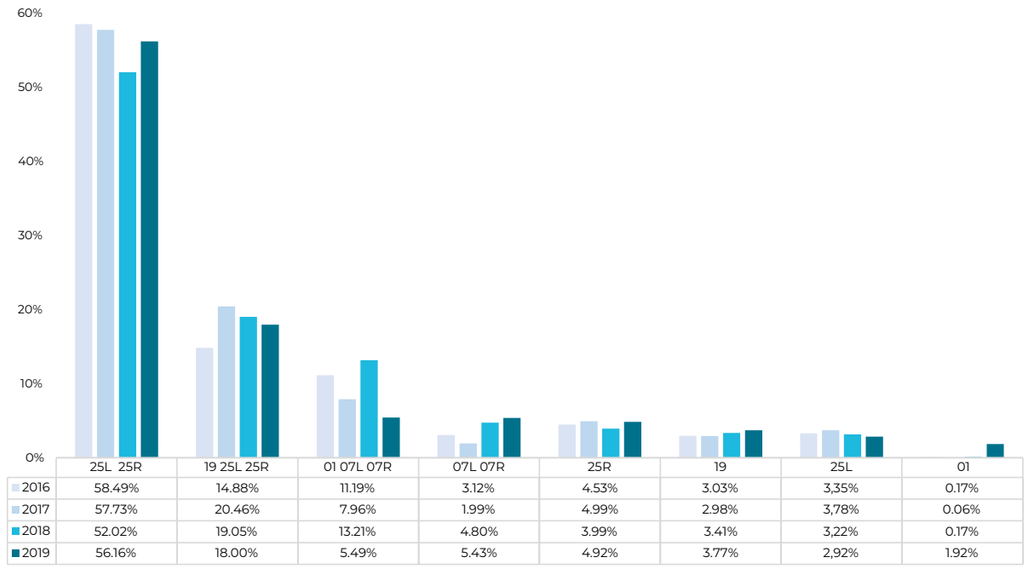


Figure 4-8: Runway Configuration Use 2016 – 2019 at EBBR

The runway configuration 25L 25R continues to be the most used one, in line with the PRS. Figure 4-8 also shows that all runway configurations were consistently used in the same order of magnitude as in previous years, except for the 01 07L 07R configuration. This is due to the overall reduction in the frequency of northeast winds compared to 2018, as it can be seen in Figure 4-6.

Looking at movements instead of time intervals

skeyes usually measures the use of the PRS in number of hours. However, it sometimes occurs that a certain RWY configuration will remain in place while there is no traffic arriving or departing at the airport. The supervisor will make a change if necessary in due time when traffic is announced. For that reason, the analysis of the PRS in use will be done in this section in percentage of flights, i.e. how many flights in comparison with the total landed in accordance with the PRS.

The figures below show the monthly evolution of the PRS use, and the comparison with the previous years. The use of the PRS measured as number of hours amounts to 78% for 2019, while the use of the PRS in terms of the number of flights taking off or landing on runways of the PRS is at 84%. This is in line with the above statement that the non-PRS configuration can be sometimes maintained while no traffic is departing or landing, and then only switched back to the PRS when traffic returns.

The percentage of flights following the PRS recovered in 2019, which is linked to the increase in frequency of southwest winds.

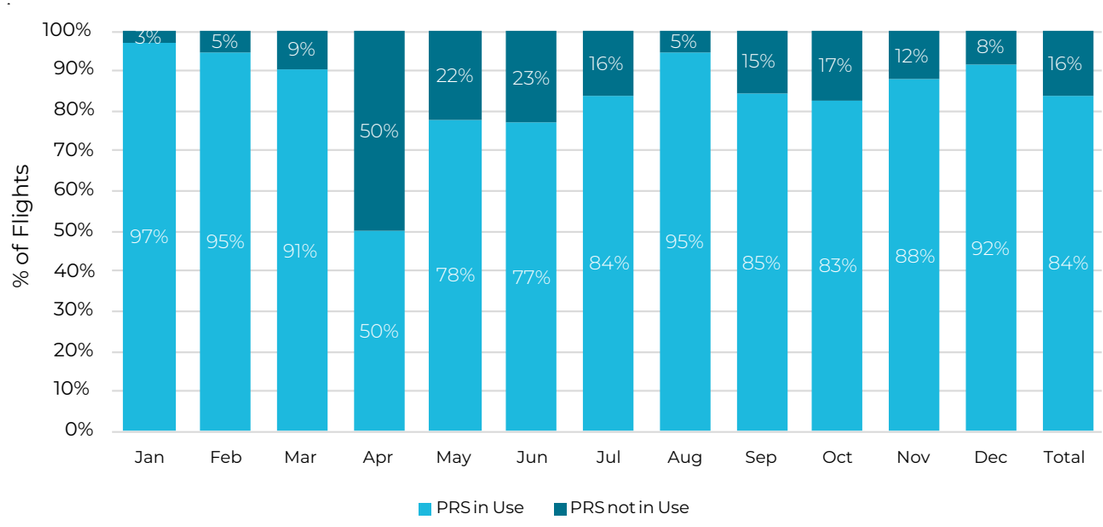


Figure 4-9: Monthly Overview of Use of PRS 2019: number of flights

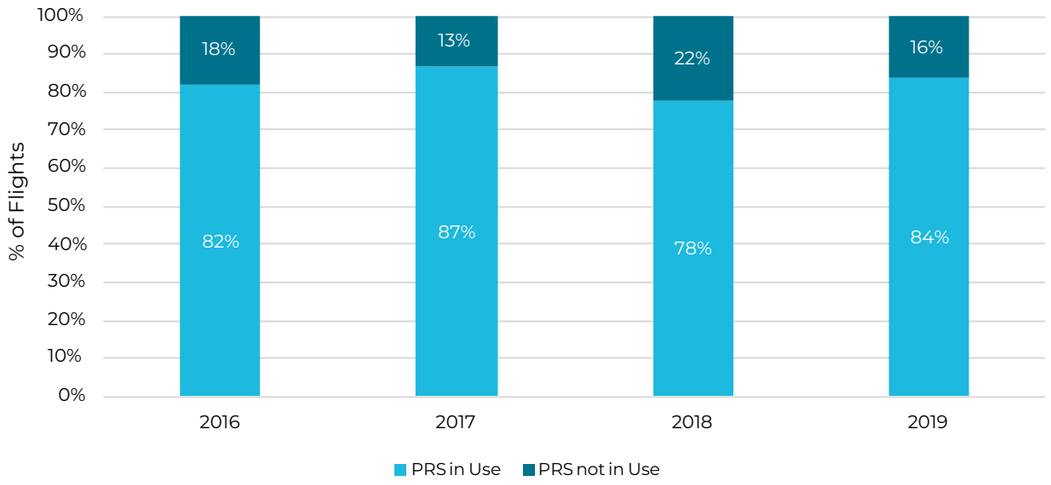


Figure 4-10: Yearly Use of PRS 2016 – 2019: number of flights

Improvement measures are ongoing

Informing the residents

Since 2014, skeyes has been undertaking various actions to improve its communication and transparency about the runway use, and this to better inform the stakeholders involved. In 2015, skeyes launched the website www.batc.be in collaboration with Brussels Airport to provide some dynamic information on the use of runways and the air traffic. A new version of the website was launched in 2018 with real-time meteorological information.

Considerations for winds aloft

Strong tailwinds can lead to unstable approaches and go-arounds. To avoid having to make an unplanned change of runway, the supervisor chooses an alternative runway when the pilots communicate the presence of strong tailwinds and request other runways.

A runway configuration change, because of winds aloft and in consideration with all other factors to account for, is currently done at the discretion of the supervisor, both for safety reasons and to avoid the need for a sudden runway change. Since 2017 wind aloft data are available for display in the control tower (via the extraction of radar data and sent through Mode S).

Use and evaluation of forecasts

Wind measurements are often used by stakeholders to assess retrospectively whether tailwind limits were respected. However, the supervisor must choose the runway configuration based on forecasts and wind measurements. Note, a change of runway configuration cannot be carried out immediately but requires time.

As a result, weather forecasts play an important role in the choice of runways in use.

Since 2018 the forecast is updated every hour (instead of three hours) to improve the accuracy.

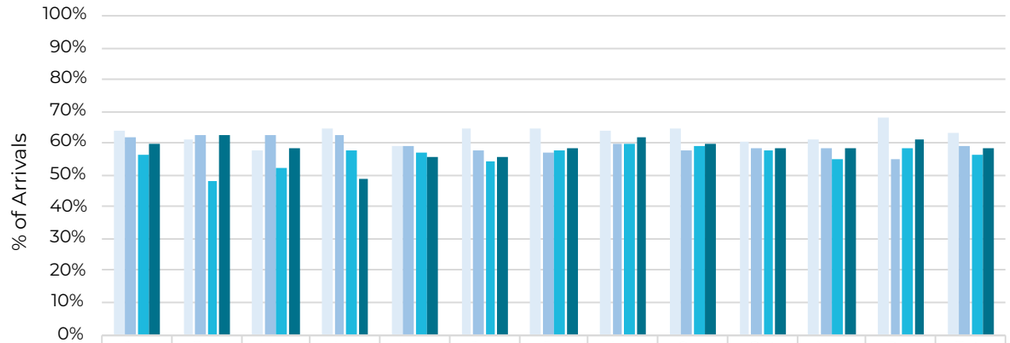
Continuous Descent Operations (CDO)

A CDO is an aircraft operating technique in which an arriving aircraft descends from an optimal position with minimum thrust and avoids level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions. By doing so, the aircraft will use less fuel and produce less noise. Based on the recommendations made by EUROCONTROL, two CDO performance indicators were developed in 2016:

- CDO Fuel: binary indicator (yes/no) indicating if a CDO was flown from FL100 to 3,000ft.
- CDO Noise: binary indicator (yes/no) indicating if a CDO was flown from FL60 to 3,000ft.

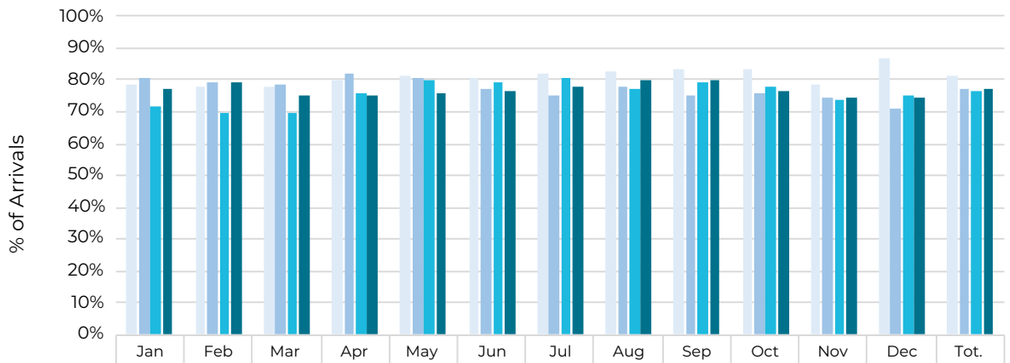
A descent is considered as a CDO if no level off lasting more than 30 seconds is detected. A level off is considered as a segment during which the aircraft has a rate of descent of less than 300 feet/minute.

Figure 4-11 and Figure 4-12 show the monthly evolution of CDOs at Brussels airport.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot.
CDO Fuel 2016	64%	61%	58%	65%	59%	64%	65%	64%	65%	60%	61%	68%	63%
CDO Fuel 2017	62%	63%	63%	62%	59%	58%	57%	60%	58%	58%	58%	55%	59%
CDO Fuel 2018	56%	48%	52%	58%	57%	54%	58%	60%	59%	58%	55%	58%	56%
CDO Fuel 2019	59%	62%	59%	49%	56%	56%	58%	62%	60%	59%	58%	61%	58%

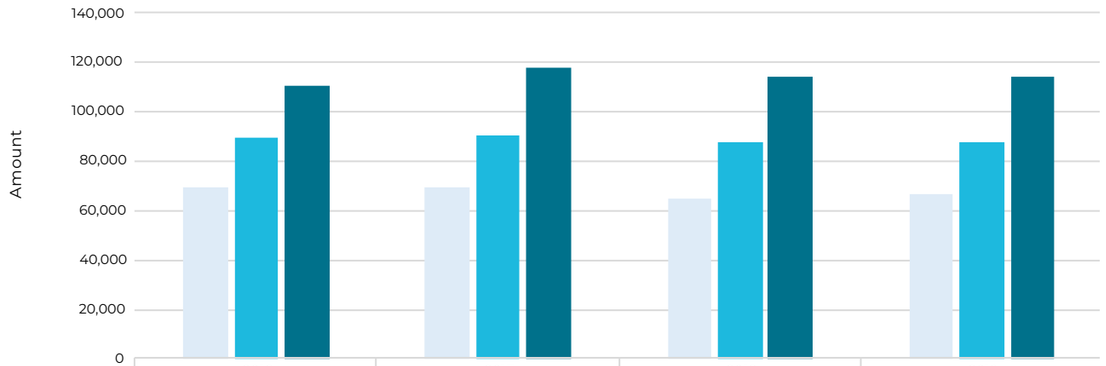
Figure 4-11: CDO Fuel usage



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot.
CDO Noise 2016	79%	78%	78%	80%	81%	81%	82%	83%	83%	84%	78%	87%	81%
CDO Noise 2017	81%	79%	79%	82%	81%	77%	75%	78%	75%	76%	74%	71%	77%
CDO Noise 2018	71%	70%	70%	76%	80%	80%	81%	78%	80%	78%	74%	75%	76%
CDO Noise 2019	77%	80%	75%	75%	76%	77%	78%	80%	80%	76%	74%	74%	77%

Figure 4-12: CDO Noise usage

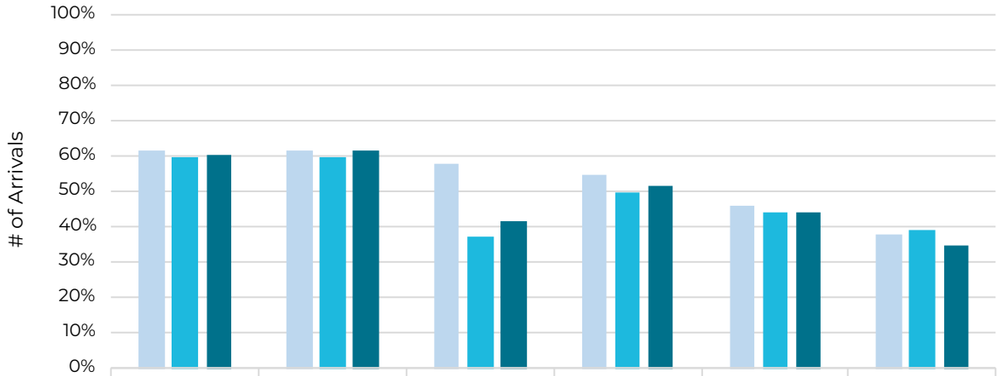
The total of CDOs per year can be observed in Figure 4-13, together with the arrivals considered in the calculation of the CDOs. Note that helicopters and military flights are not counted in the arrivals for the calculation of the CDO indicator. Missed approaches are also excluded.



	2016	2017	2018	2019
CDO Fuel	69,577	69,805	64,631	66,534
CDO Noise	89,938	90,873	87,511	88,017
Arrivals	110,642	117,636	114,718	114,425

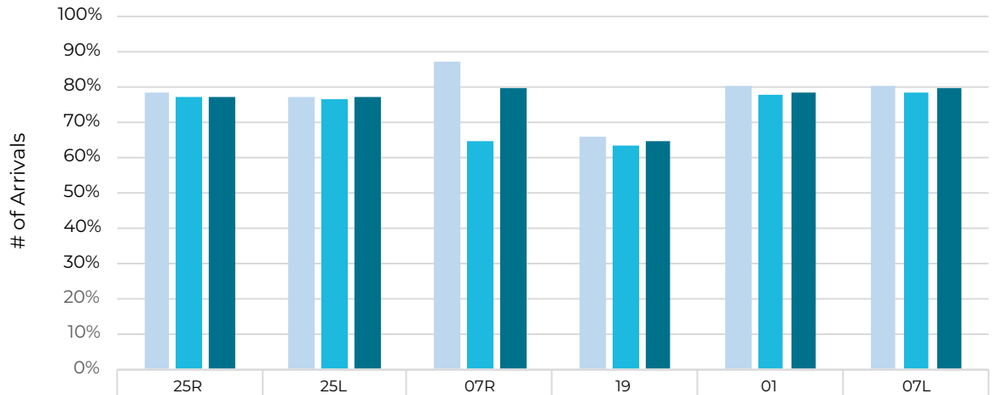
Figure 4-13: Total CDO Fuel and Noise per year

Figure 4-14 and Figure 4-15 show that the CDO percentages are stable over the past 4 years, with the CDO Noise close to 60% and the CDO Fuel around 80%. When looking at the CDOs flown per runway, it can also be seen that ratio of CDOs flown are similar to the previous year for each runway.



	25R	25L	07R	19	01	07L
CDO Fuel 2017	62%	62%	58%	55%	46%	38%
CDO Fuel 2018	60%	60%	38%	50%	44%	39%
CDO Fuel 2019	61%	62%	42%	51%	44%	35%

Figure 4-14: CDO Fuel per runway



	25R	25L	07R	19	01	07L
CDO Noise 2017	78%	77%	87%	66%	80%	80%
CDO Noise 2018	77%	76%	65%	64%	78%	78%
CDO Noise 2019	77%	77%	79%	64%	79%	80%

Figure 4-15: CDO Noise per runway

CDO statistics are inherently variable, because they are influenced by such a multitude of external factors, such as:

- Pilot CDO flying experience
- Pilot experience with specific airport
- ATC experience
- Runway usage (equipment)
- Aircraft type/equipment
- Military airspace open/closed
- Traffic flows
- “Impact” of other traffic streams on arriving traffic.

As a result, it is difficult to explain an increase or decrease from one year to the next, especially when such small variations are observed.

Improvement measures and activities

To promote and facilitate the number of CDOs flown to EBBR, different measures are investigated or already implemented:

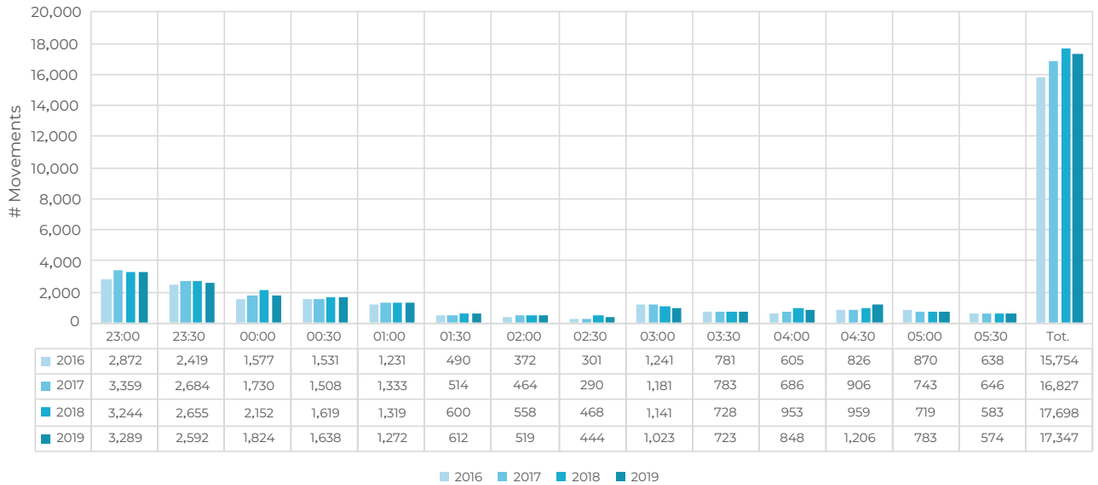
- skeyes is in contact with airlines presenting CDO statistics and communicating the phraseology;
- skeyes is increasing awareness amongst ATCOs through courses, and by informing them of the current statistics and performance;
- skeyes and Brussels Airport Company maintain a cooperation agreement with Brussels Airlines, TUI Fly and DHL, on undertaking joint initiatives that further reduce the environmental impact of airport operations. Furthermore, the agreement on ‘collaborative environmental management’ (CEM) at Brussels airport, signed also by EUROCONTROL and ACI Europe, continues to show benefits.
- The publication of PBN procedures on RWY 07R and 07L could allow a higher number of CDOs flown on these runways.
- The working procedures on RWY 07R and 07L between APP and EBBR should be reviewed, as these runways are increasingly used for arrivals (see Figure 1-8).

Less night movements in 2019

At Brussels Airport, the federal government has set a limit of maximum allocated night slots. The regulation in the matter is the Ministerial Decree of the 21st of January 2009. This decree states that a maximum of 16,000 night slots per calendar year can be allocated. Night is defined as from 23:00 to 06:00 local time.

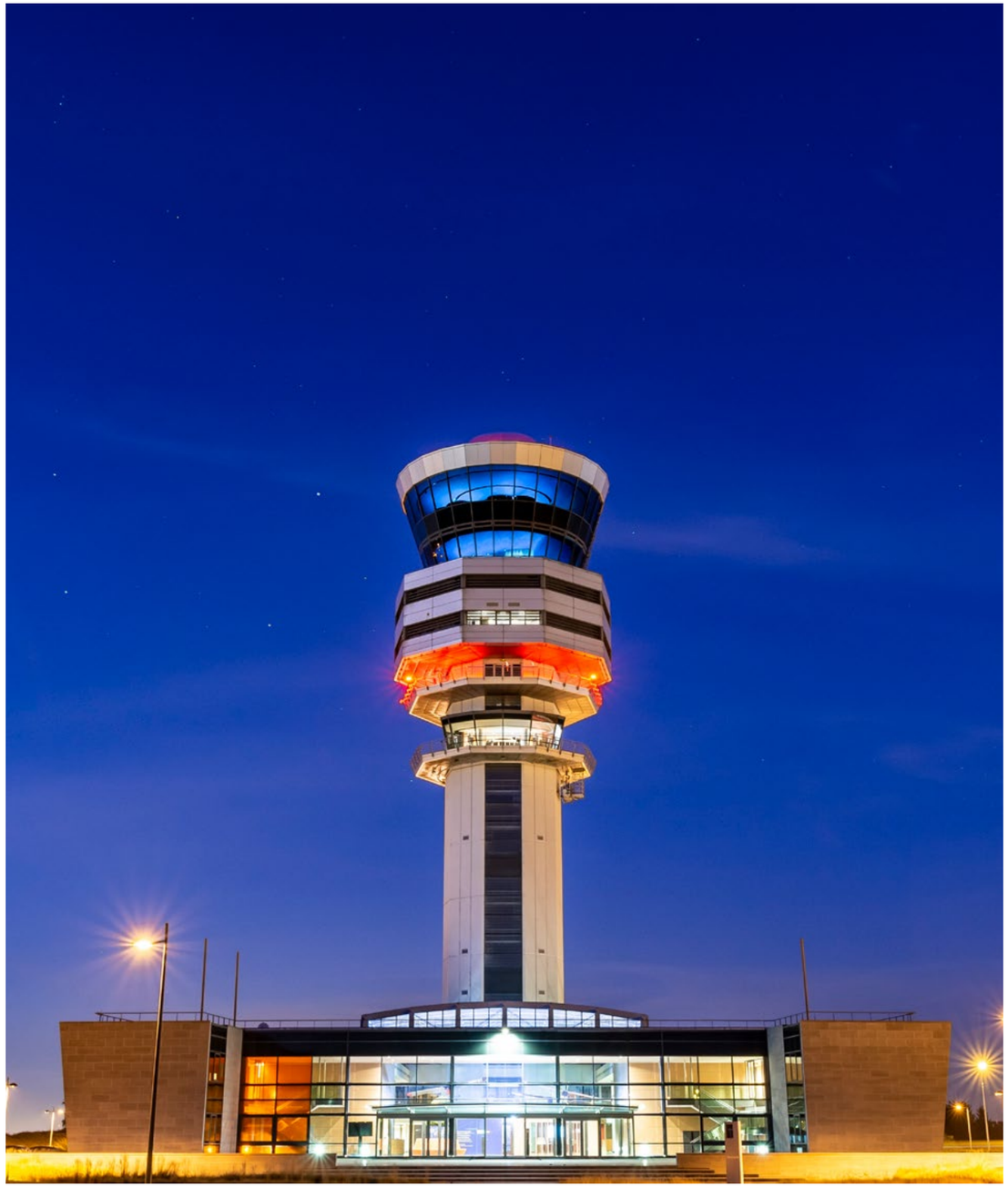
In 2019, 17,347 night movements were recorded at Brussels Airport by the AMS. Note that this does not imply that the legal limit was exceeded, as this number includes flights with earlier slots which operated after 23:00 LT due to delays, and flights which are exempted from slot allocation, i.e. flights with military or diplomatic status or helicopter flights.

Figure 1-7 in Chapter 1 provided the distribution of day and night movements. The following graph shows the distribution of the night movements throughout the night. More movements are recorded before midnight, and the quietest part of the night is between 01:30 and 03:00 LT. There were 351 less night movements in 2019 than in 2018, stopping the increasing trend which had been seen in the past years.



	23:00	23:30	00:00	00:30	01:00	01:30	02:00	02:30	03:00	03:30	04:00	04:30	05:00	05:30	Tot.
2016	2,872	2,419	1,577	1,531	1,231	490	372	301	1,241	781	605	826	870	638	15,754
2017	3,359	2,684	1,730	1,508	1,333	514	464	290	1,181	783	686	906	743	646	16,827
2018	3,244	2,655	2,152	1,619	1,319	600	558	468	1,141	728	953	959	719	583	17,698
2019	3,289	2,592	1,824	1,638	1,272	612	519	444	1,023	723	848	1,206	783	574	17,347

Figure 4-16: Number of movements between 23:00 and 06:00 LT (hour indicates start time of 30 min period)



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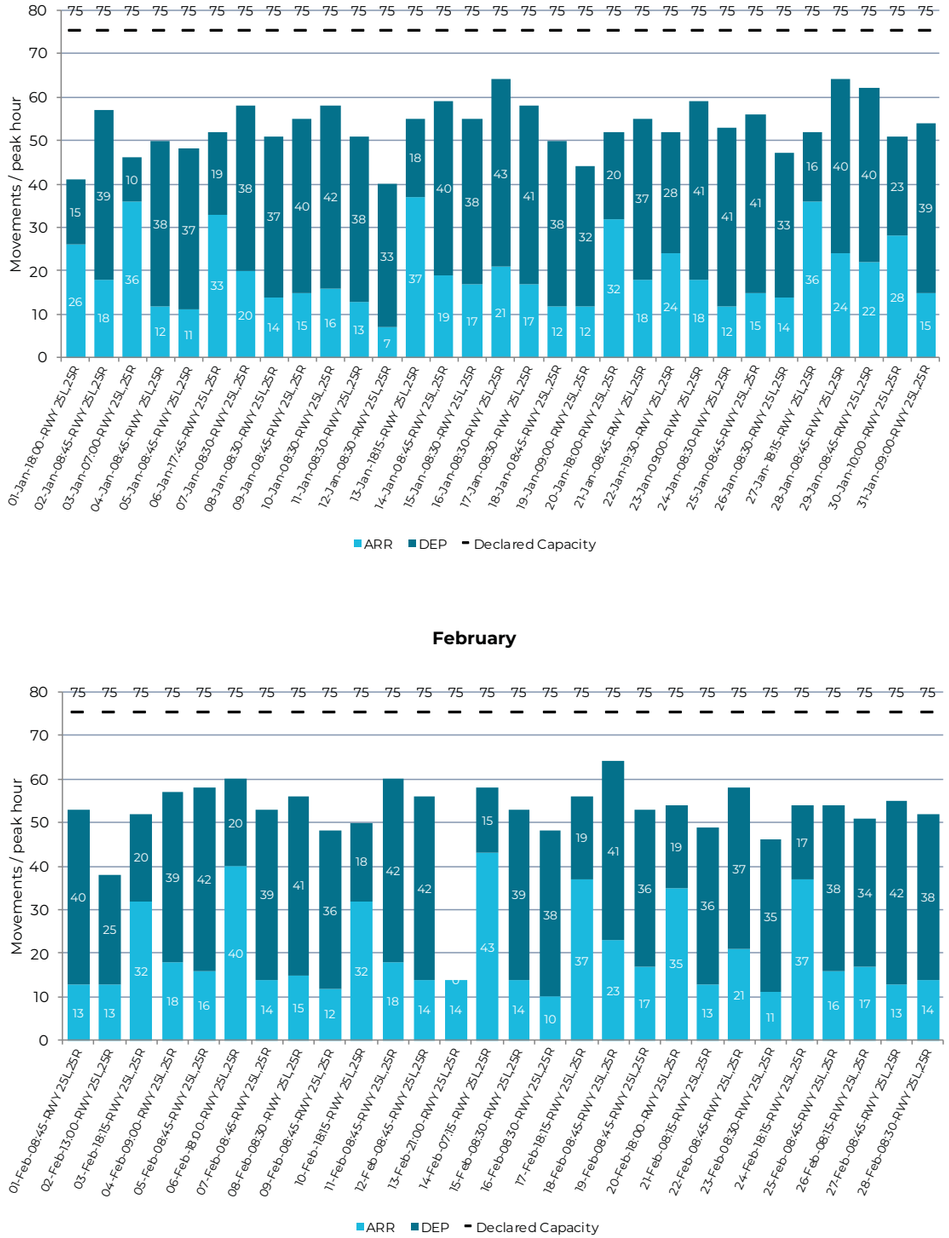
ANNEX

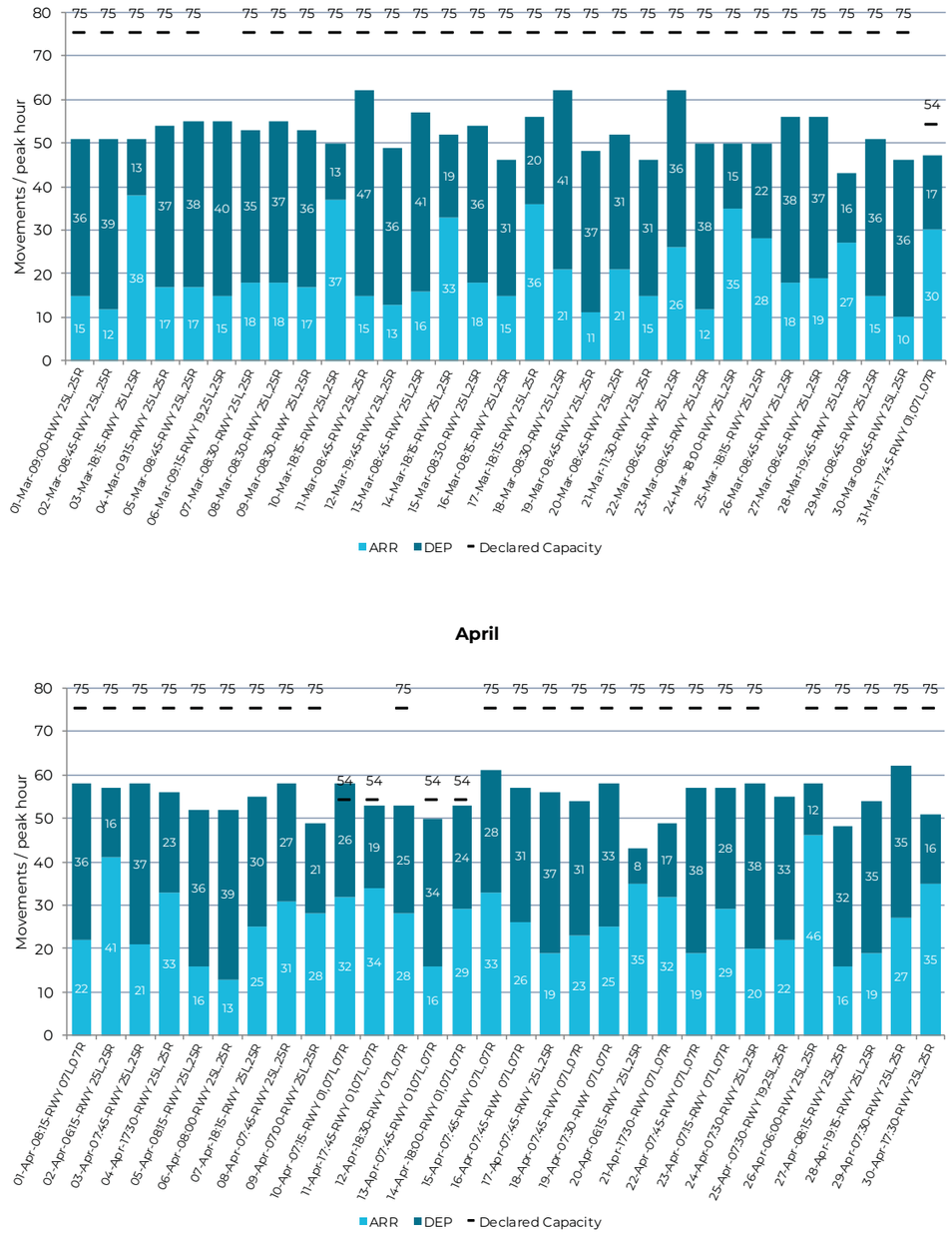
Annex 1: Monthly overview of arrivals and departures at peak hours

January



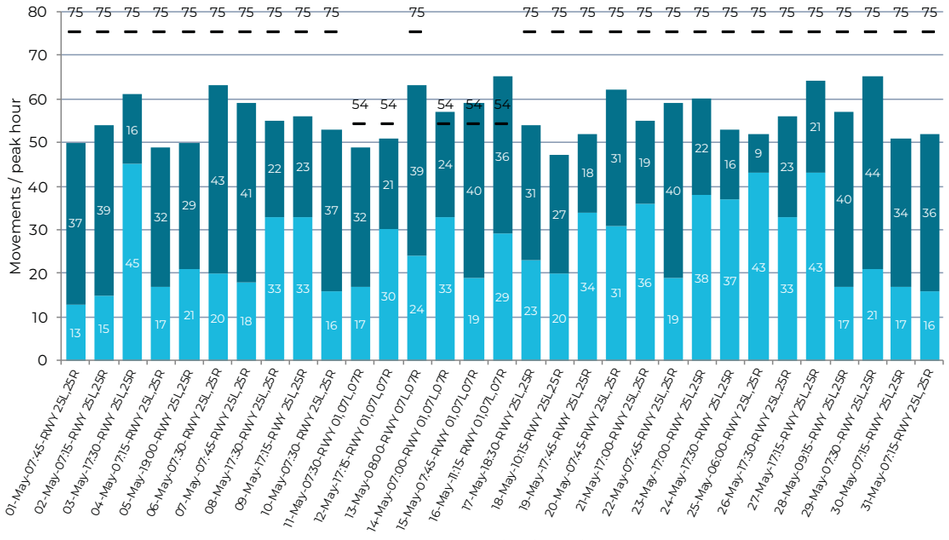
February

March

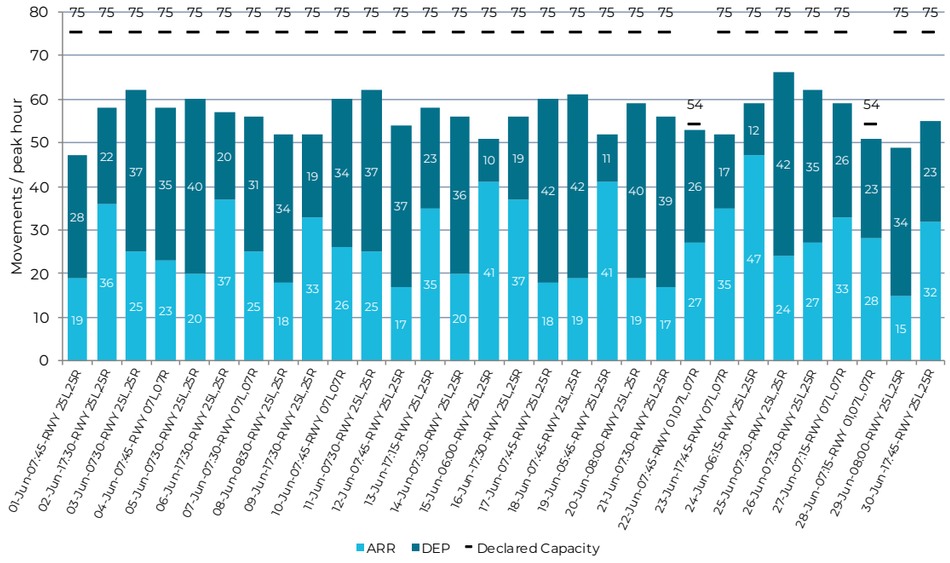


April

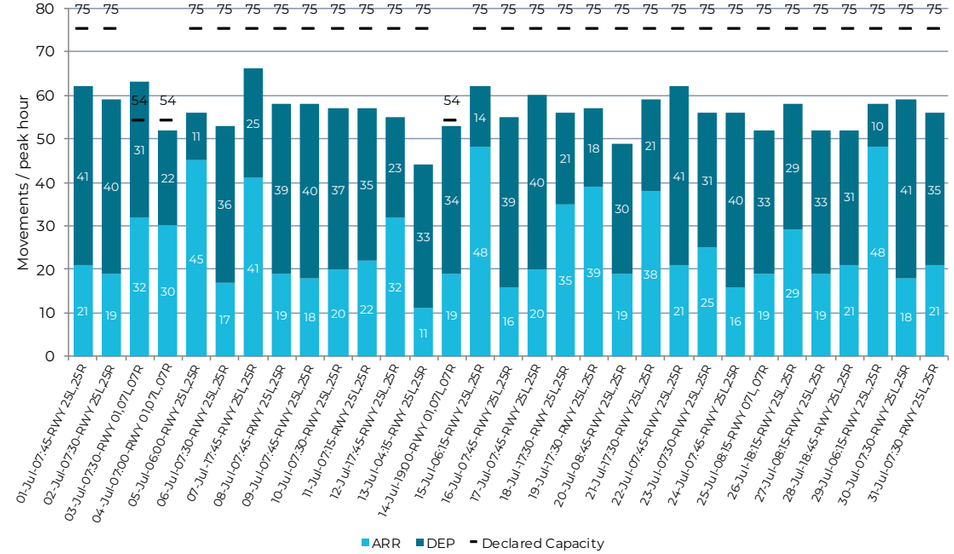
May



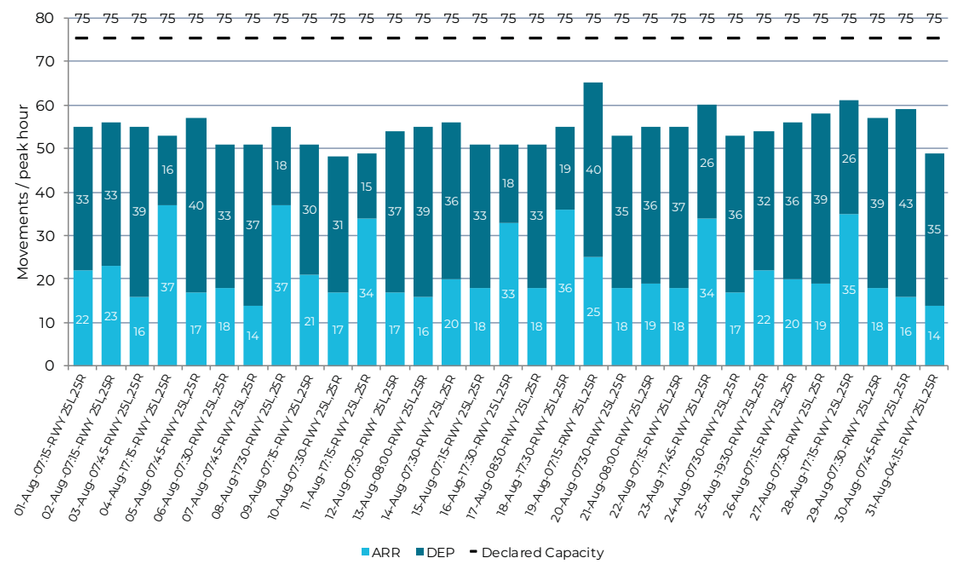
June



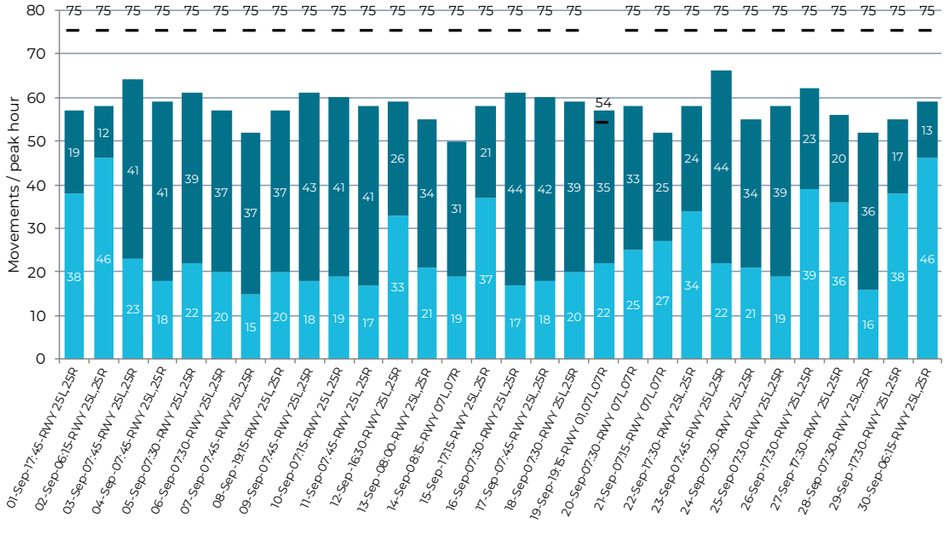
July



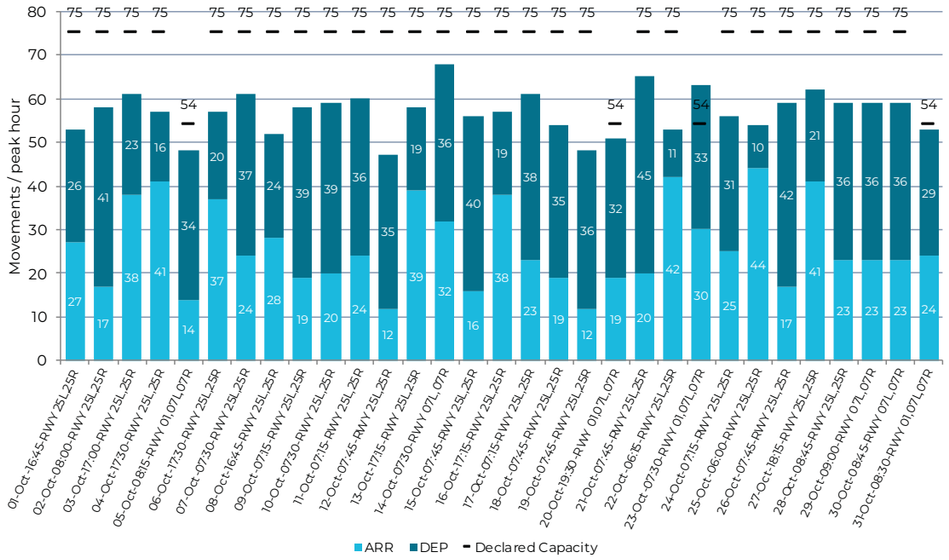
August



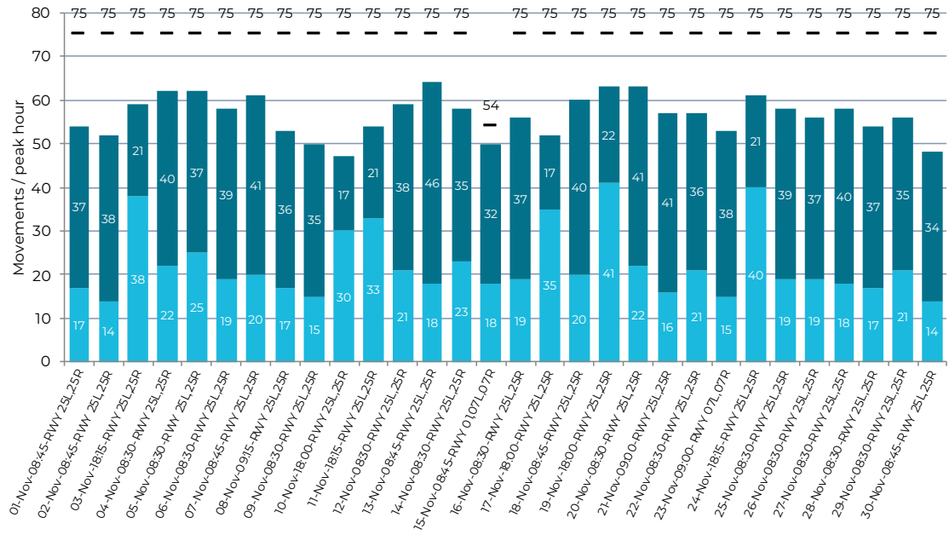
September



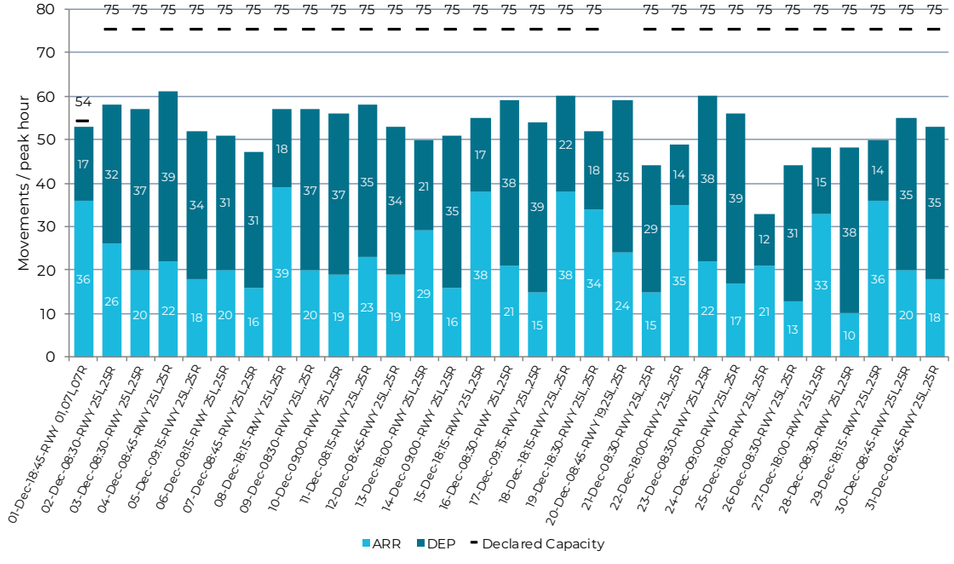
October



November



December



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