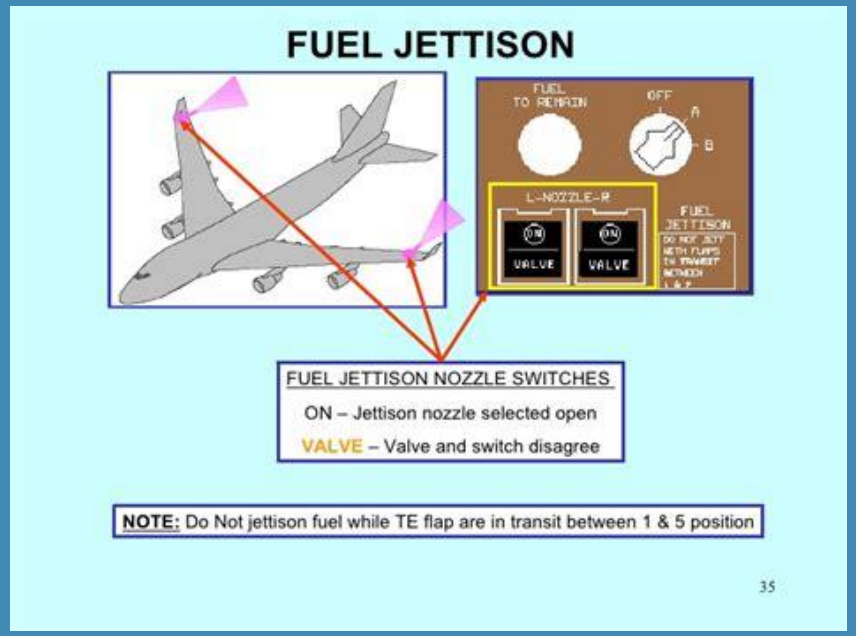
FUEL JETTISON

PRIMARY POINTS

- Fuel Jettisoning is an important safety function for some airplanes
- The majority of airliners do not have the ability to jettison fuel
- In 2019 at SEA, only about 4% of the departures had fuel jettisoning capability
- Jettisoning is always used to meet an emergency or non-normal situation. A normal flight never plans on jettisoning fuel
- Most pilots will go through their entire career without ever using the procedure – while it is not unheard of, it is a pretty rare occurrence

JETTISON PANEL AND DIAGRAM



NO JETTISON CAPABILITY

Q 400

Airbus A320

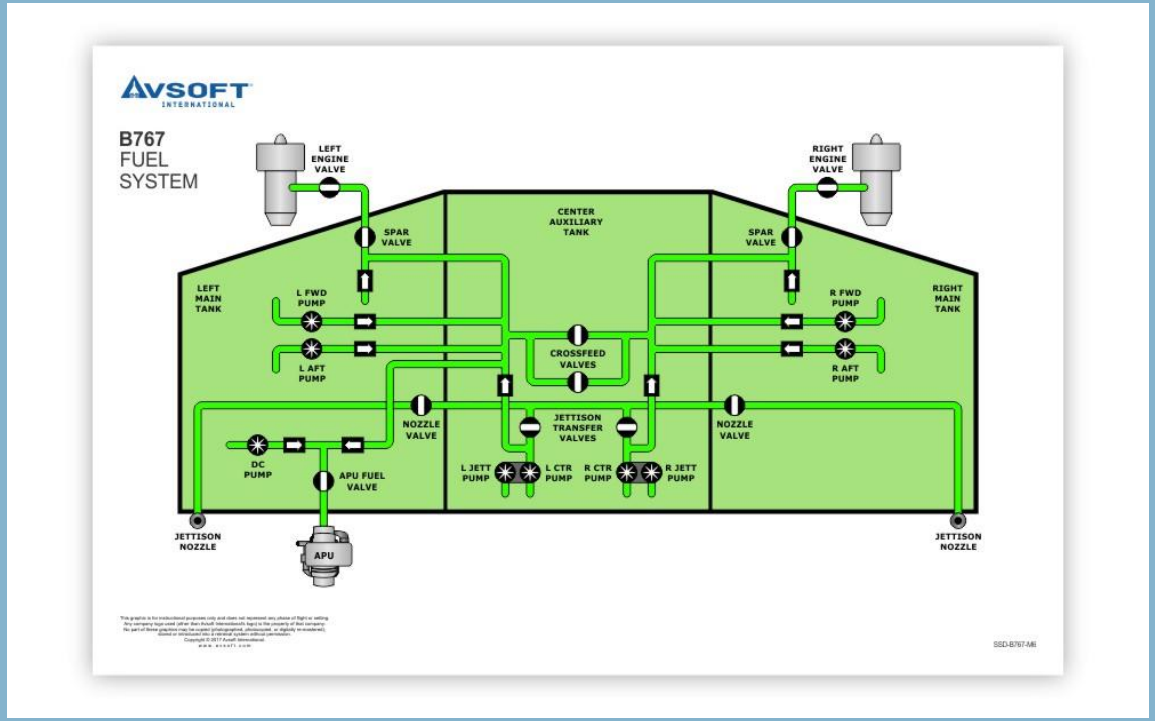
Boeing 757

Boeing 737

EMB- 170/190

CRJ 700

“PARTIAL” CAPABILITY



Boeing 767

AIRBUS A330-200 & -300

JETTISON CAPABLE

Boeing 747

Boeing 777

MOST DEPARTURES FROM SEA DO NOT HAVE THE ABILITY TO JETTISON FUEL

Ranked aircraft landings in 2019

Unable to jettison = ——
Some models/some time = ☐

Select year: 2019

Aircraft Type	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Total
Boeing 737	6,619	5,990	7,218	7,322	7,907	8,302	9,010	9,013	7,803	7,740	6,858	6,925	~~90,707~~
Embraer 170	3,309	2,737	2,784	2,996	2,859	2,887	3,314	3,460	3,037	3,554	3,103	2,309	~~36,349~~
Airbus 320	2,282	1,980	2,506	2,623	2,937	3,316	3,420	3,551	3,038	2,975	3,165	3,476	~~35,269~~
De Havilland Dash 8	2,796	2,160	2,627	2,503	2,627	2,496	2,536	2,524	2,216	2,410	2,474	2,659	~~30,028~~
Boeing 757	561	492	599	546	654	678	702	730	558	405	414	486	~~6,825~~
Bombardier CRJ-900	4		330	2	320	347	23	35	449	34	26	962	~~2,532~~
Boeing 717	420	358	332	180	183	264	294	261					~~2,292~~
Boeing 767	197	155	35	198	243	239	235	236	195	161	138	138	2,170
Airbus 330	162	140	152	131	132	143	177	189	192	211	233	300	2,162
Boeing 777	154	136	263	121	138	125	131	138	130	142	177	181	1,836
Boeing 787	101	92	105	157	160	162	171	168	158	145	96	70	1,585
Airbus 220						33	61	123	262	357	261	296	~~1,393~~
Airbus 350		1	32	70	80	77	95	92	101	94	35	41	718
Boeing 747			30	60	53	60	62	62	57	53			437
Embraer 190						15	62	35	6				~~118~~
Bombardier CRJ-700	1	1		2	3	1	2	2	6	2	2	1	~~29~~
Bombardier CRJ-200		3		1					1		1	6	~~12~~
Airbus 340											8		8
McDonnell Douglas MD-80										2			~~2~~
Airbus 300					1								1
Bombardier								1					1
McDonnell Douglas MD-90	1												~~1~~
Total	16,607	14,245	17,013	16,912	18,297	19,145	20,295	20,620	18,209	18,285	16,991	17,850	214,469

WHY IS THERE A JETTISON SYSTEM IN THE FIRST PLACE?

The regulations for certification stipulate that transport category airplanes must meet certain climb performance or have a fuel jettisoning system installed CFR 25.1001:

- Some airplanes (MD-11 & 747) need a jettisoning system in order to meet these requirements
- Other airplanes (777 & some 767s) meet the requirements but have a jettisoning system installed anyway
- Still other airplanes (737, A320, 757) meet these requirements and do not have a jettison system installed

As far as the pilot is concerned, what is important is the increase in the margin of safety that the ability to jettison fuel affords

THE FUEL JETTISONING DECISION

- Landing overweight and fuel jettisoning are both considered safe procedures (Boeing)
- However, landing overweight reduces the normal safety margins depending on the degree of the overweight condition and the particular conditions that day
- In addition, delaying the landing, in order to burn fuel, with a malfunctioning system or engine failure may expose the airplane to additional system deterioration that may make the situation worse.

GUIDANCE PROVIDED TO THE PILOT

- Company guidance is provided to the pilot by the airlines Operations Manual (Handbook) and Operation Specifications (OpsSpecs)
- FAR 121.557 Emergency authority

> "In an emergency situation that requires immediate decision and action the pilot in command may take any action that he considers necessary under the circumstances. In such a case he may deviate from prescribed operations procedures and methods, weather minimums, and this chapter to the extent required in the interest of safety."

RANGE OF NON-NORMAL AND EMERGENCY SITUATIONS

Some emergency situations can be very fast moving, ambiguous and time compressed

Or we could have a less dramatic slower paced situation where the decision is made collaboratively with company dispatch and coordinated with ATC

Most importantly, from the pilot's perspective, the perceived time available is likely one of, if not the most critical factor for how the fuel jettisoning procedure will be handled

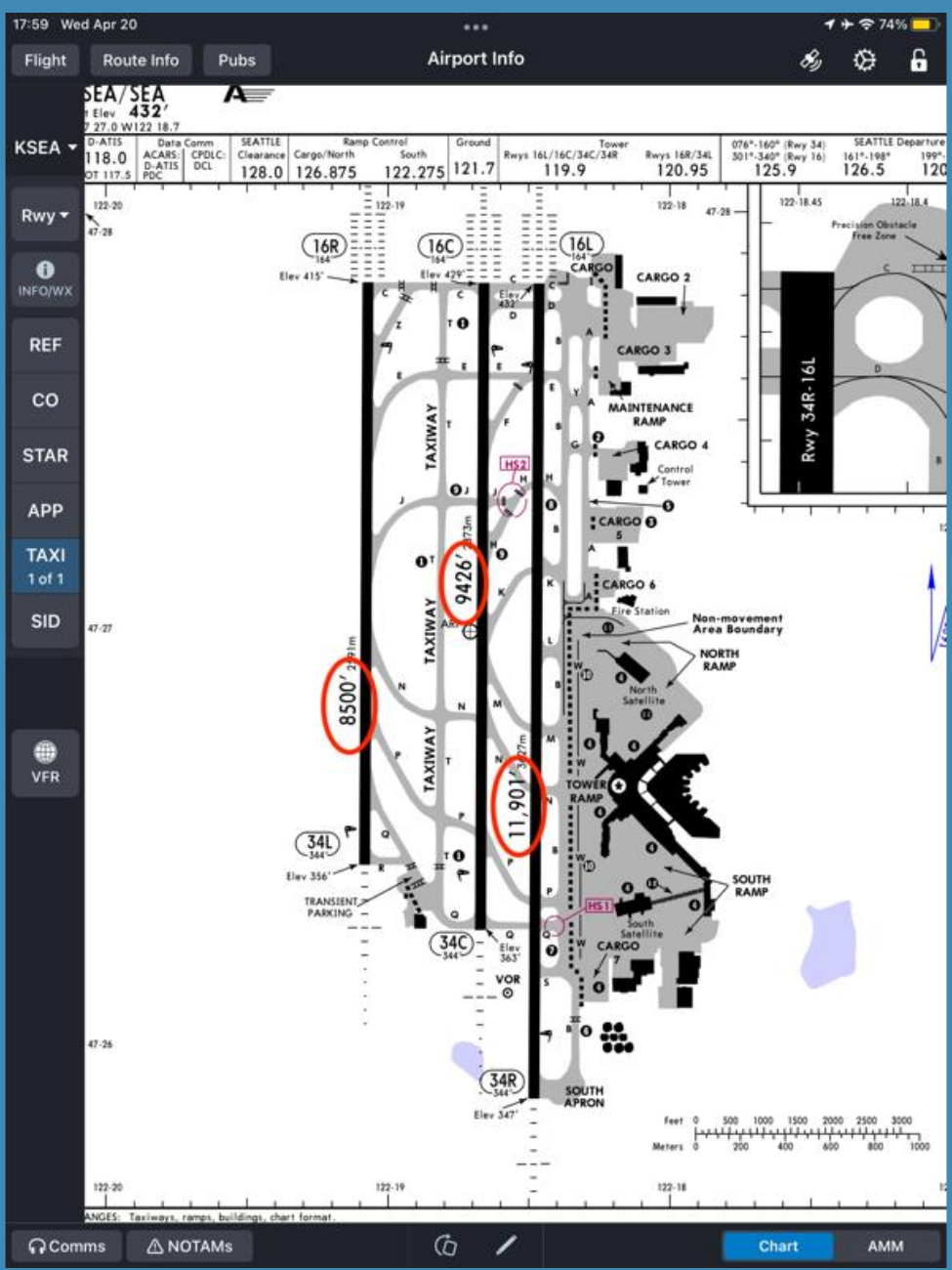
POSSIBLE SCENARIO

SYSTEM FAILURE

- If a large airplane departing on a long flight must return to the airport of departure it may be smart to jettison fuel to maintain normal safety margins
- The pilots will consider many factors including the landing distance required and weather conditions

Normal landing typical day 5000’ of runway required
(15 degrees C, Wet Runway)

Non-normal configuration at or near Maximum Takeoff weight
8000’ to 13,500’ of runway required depending on the severity
of the problem


17:59 Wed Apr 20
74%
Flight
Route Info
Pubs
Airport Info
KSEA
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1 of 1
SID
VFR
SEA/SEA
Elev 432'
D-ATIS 118.0
Data Comm ACARS: D-ATIS PDC CPDLC: DCL
SEATTLE Clearance 128.0
Ramp Control Cargo/North 126.875 South 122.275
Ground 121.7
Tower Rwys 16L/16C/34C/34R 119.9 Rwys 16R/34L 120.95
076°-160° (Rwy 34) 301°-340° (Rwy 16) 125.9
SEATTLE Departure 161°-198° 126.5
16R
16C
16L
Elev 415'
Elev 429'
CARGO
CARGO 2
CARGO 3
MAINTENANCE RAMP
CARGO 4
Control Tower
CARGO 5
CARGO 6
Fire Station
Non-movement Area Boundary
NORTH RAMP
North Satellite
TOWER RAMP
SOUTH RAMP
South Satellite
CARGO 7
TAXIWAY
HS2
HS1
9426'
8500'
11,901'
34L
Elev 356'
TRANSIENT PARKING
34C
Elev 363'
VOR
34R
Elev 347'
SOUTH APRON
Rwy 34R-16L
Precision Obstacle Free Zone
Feet 0 500 1000 1500 2000 2500 3000
Meters 0 200 400 600 800 1000
Comms
NOTAMs
Chart
AMM

POSSIBLE SCENARIO

MEDICAL EMERGENCY

- In a medical emergency, procedures are provided in the flight attendant and pilot operating manuals
- Most companies maintain a system where there is the capability to establish direct communication with a physician on the ground and the airplane in flight
- The best course of action may include jettisoning fuel

RECAP

- Fuel Jettisoning is an important safety function for some airplanes
- The majority of airliners do not have the ability to jettison fuel
- In 2019 at SEA, only about 4% of the departures had fuel jettisoning capability
- Jettisoning is always used to meet an emergency or non-normal situation, and a normal flight is never predicated on its use
- Most pilots will go through their entire career without ever jettisoning