HONDA LANDING PHASE CONSIDERATIONS

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Chief Pilot

CONTENTS

INTRODUCTION AND PITFALLS

Why the Honda is truly unlike any aircraft ever built

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WHY THE HONDA IS A TRICKY AIRCRAFT (AND ENJOYABLE ONE) TO LAND

- ***Large vertical surface areas***
  - *Vertical Stabilizer (increases weathervane tendencies)*
  - *Winglets (nearly 3 feet in length, more weathervane)*
  - *Engine Pylons (act as side sails in cross winds)*
- ***Low wing clearance***
  - *Leaves little in the way of aileron authority*
  - *Makes crosswinds difficult*
- ***Trailing Link Landing Gear***
  - *Difficult to establish when contact is made with the ground*
  - *Increased "teeter totter" tendences between the main mounts*
- ***Narrow Wheelbase***
  - *Leads to lack of stability between the main landing gear (WWII taildraggers)*
- ***High pressure/small surface area tires***
  - *Small tires, large pressure*

THE AIRCRAFT MUST BE FLOWN TO A STOP

COMMON THREADS (AIRMANSHIP)

Source: NTSB Accident Reports

- *“I was high and fast on final”*
- *“I had excessive float down the runway"*
- *“I went to engage the brakes and felt nothing”*

LANDING DISTANCE FACTORS

Straight from the AFM

02

CROSSWINDS

Honda has allocated 2 separate pages in Chapter 4

- *Several Cautions and Warnings about Crosswind Capability*
- *Second page also has associated notes*
- *This is just the bare minimum associated from the manufacturer. Pilots would do well to take heed from these notes and warnings*
- *Volato has added further safeguards with special consideration to wet runways and high crosswinds (notes to follow)*

CROSSWIND PROCEDURES

GENERAL

These procedures are applicable for crosswind takeoff and landing with or without the optional speedbrake.

CAUTION *Takeoffs and landings on contaminated runways can have significant additional risks due to the varied surface conditions likely to be encountered.*

CAUTION *For takeoffs and landings on wet or icy runways, the maximum crosswind capability may be significantly reduced due to the reduced steering authority contributed by the nosewheel.*

CAUTION *Operations with any tailwind component in conjunction with crosswinds, especially on contaminated runways, should be avoided due to the inherent hazard of operating on such runways.*

CAUTION *Large and prompt aileron and rudder pedal inputs may be required in crosswind conditions close to or exceeding the maximum allowable crosswind or in gusty conditions.*

CROSSWIND LANDING PROCEDURE (continued)

NOTE Lateral control during the ground roll has been shown to be relatively ineffective in countering wing rocking motions, which may occur after touchdown of one main gear prior to the opposite main gear. Use steady, upwind aileron input to maintain main gear firmly in contact with the ground rather than attempting a counter rocking motion.

NOTE Approximately 2 seconds after nosewheel has registered weight-on-wheels, the nosewheel steering becomes active, and the steering will then move to the position being commanded by the rudder pedals. This transition may introduce a yawing response, which should be promptly countered using rudder inputs.

NOTE Rudder and nosewheel steering are significantly more effective in maintaining directional control than differential braking. In addition, the amount of available differential braking may be reduced if anti-skid is active.

NOTE The contribution to directional stability from the main wheels is reduced with increased braking. If directional control is in question, release the brakes and apply rudder as required to correct. Once directional control has been re-established, apply symmetrical braking.

SURFACE CONDITIONS

Honda has also included the following information from the AFM regarding wet surface conditions. 30% is a rather large increase regarding total landing distance.

Example: if the data requires 3800 feet of runway to stop, the 30% recommendation now creates a stopping distance of 4940 feet.

Per 135 regulations of being able to stop within 60 percent of the Available landing distance. If this was performed on a wet 5,000 foot strip of asphalt, that leaves a 60-foot margin.

Because of this required distance, Volato has added the following restrictions regarding landing distance:

Dry Runway: 5,000 foot LDA

Wet Runway:6,000 foot LDA

NOTE The takeoff field length provided in the performance section of the flight manual is based on a dry runway. If departing from a wet runway, it is recommended to increase the predicted takeoff field length by 30%.

5. Landing Data — Set and confirmed
   a. Radios and Navigation ..... Set
   b. V-speeds, FMS, and Flight Guidance..... Set, programmed, and modes selected
   c. Landing Distance.....Confirm

NOTE The landing distance provided in the performance section of the flight manual is based on a dry runway. If landing on a wet runway, it is recommended to increase the predicted landing distance by 30%.

ADDITIONAL BACKUP

N192WS / HondaJet Elite S / Honda GE HF-120

Generated Sat, 17 June 2023 14:48 UTC with version 4.8.13

Landing

	Arrival
ICAO	KBGM
Runway (Slope)	34 (0.90)
LDA	7100 ft
Flap	**LDG**
Wind / Temp C / Altimeter	32014 T / 20 / 29.75 (1007)
Crosswind / Headwind	2 knots / 14 knots Headwind

Options DRY, ANTI-ICE OFF, 80% LANDING FACTOR

LDW: 9433 lb	Arrival
VFS	**140**
VAPP	**119**
VREF	**114**
Landing Distance	3358 ft
1.25 LD Distance	4198 ft
MA Climb Gradient	7.4

- *14 CFR 91.103 states that pilots will become familiar with the following:*
- *Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include—*
- *(a) For a flight under IFR or a flight not in the vicinity of an airport, weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which the pilot in command has been advised by ATC;*
- *(b) For any flight, runway lengths at airports of intended use, and the following takeoff and landing distance information:*
- *(1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and*
- *(2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.*

VOLATO ADDED SAFEGUARDS

Volato has added more to our restrictions than manufacturer recommend practices.

We insist on including this in all of our material and ensure all departments are utilizing this information as a way to establish a consistent baseline expectation for all stakeholders and pilots.

This furthers Volato's commitment to operating within the highest degrees of safety.

Appendix 4- Runway Performance and Special Use Airports

Volato HondaJets have a unique ground handling performance that can predicate numbers, or lack thereof, for landing at intended destinations. While Volato has operated with these numbers before, it is far more appropriate to place this section in the SOP than in the GOM.

These numbers refer to landing distances only, where as take off is subject to the ability to meet the Accelerate-Stop numbers. Should there be any ability for the aircraft to not meet the Accelerate-Stop requirements, the PIC will contact OCC to advise and discuss. Volato shall not argue with performance limiting numbers.

For all flights into normal airports:

Max Crosswind Component: 20 Knots ALL HA-420 SERIES
5,000 foot Landing Distance Available, (LDA) Dry
6,000 foot Landing Distance Available, (LDA) Wet
FICON 4/4/4 OR LESS IS NOT AUTHORIZED FOR LANDING
SEE CHART/EXERPT BELOW FOR ACCEPTABLE CROSSWIND LIMITATIONS

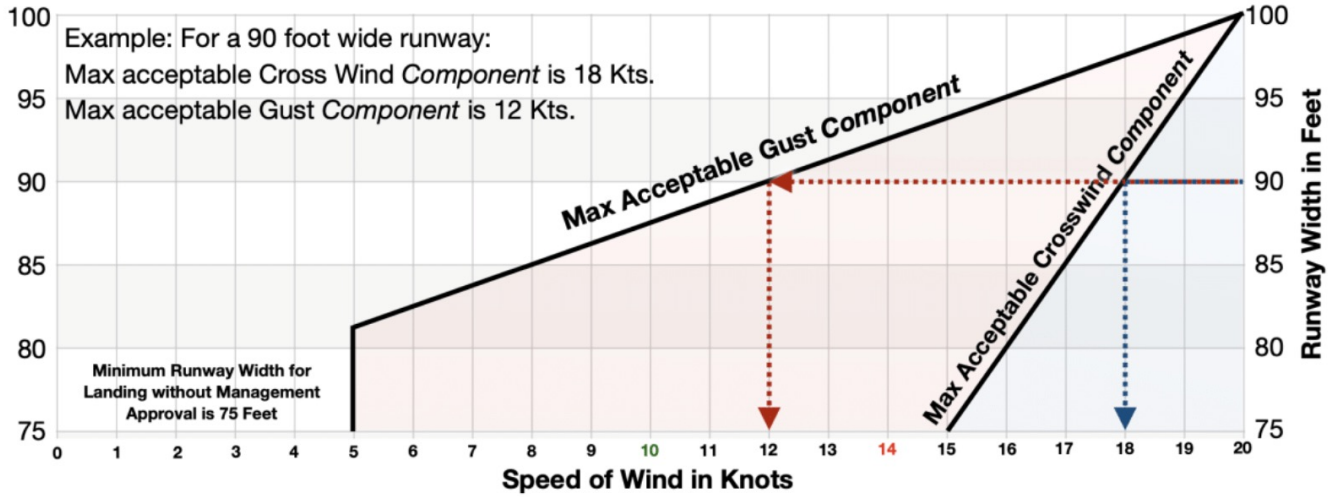
VOLATO ADDED SAFEGUARDS (CROSSWINDS)

As you can see, we take the available runway width and compare it to the wind gust factor that is applied to this chart.

Should any one variable be out of alignment, this would consistute a no-go on the approach

Our chart would allow the crew to make the safe decision to not attempt the approach and landing, thereby departing to a nearest suitable alternate

SEE CHART/EXERPT BELOW FOR ACCEPTABLE CROSSWIND LIMITATIONS



Example: Wind is reported as 300 @ 20 G 28, Landing Rwy. 27, Runway dims are 8,000' x **90'**
30° offset from the right to left.
Crosswind *Component* is calculated as **10** Kts. Acceptable as this is less than 18 Kts.
Gust *Component* is calculated as **14** Kts. **Not Acceptable** as this is more than 12 Kts.

We cannot land because the 12 Kt. Max. GUST Component Limit is exceeded.

CERTIFICATION VERSUS REGULATION

“Just because something is Legal, does not make it smart”

- *Certification standards are conducted in a highly structured routine environment to create data, baselines, and limitations. These are derivatives of an exhaustive testing regime. Do not exceed limitations*
- *If the limitations and other safeguards should fail, owner/operators, pilots, and organizations should look at increasing their restrictions in order to ensure a safe outcome to the flight*
- *Prior Proper Planning Prevents Poor Performance*

STABILIZED APPROACH CONCEPT

When Going Around, or when not to, is appropriate

03

STABILIZED APPROACH CONCEPT

- *A stabilized approach begins at the approach brief*
  - *Factors to consider*
  - *A stabilized approach is not a singular decision*
  - *Standardizing all approaches, IFR/VFR*
  - *Providing Extra Clues to ensure stability*
    - *Backup (ILS, RNAV Approach)*
    - *Environmentals (Wind, Rain, Visibility)*
    - *Stopping distance (CDU predicated numbers)*

REMEMBER: WHEN IN DOUBT, GO AROUND!
250 lbs of jet fuel is miniscule in cost compared to an Accident, incident, or worse, fatality!

Appendix 2 – Stabilized Approach

Stabilized Approach Guidance. Failure to recognize the need for a missed approach and to execute a missed approach is a major cause of approach and landing accidents. The following guidance provides a standardized method of determining when a go- around and missed approach is appropriate.

An approach is considered stabilized when all of the following criteria are met:

- All briefings and checklists have been completed.
- The aircraft is on the correct flight path.
- Only small changes in heading/pitch are required to maintain the correct flight path.
- The aircraft speed is not more than target airspeed + 10 knots and not less than target airspeed -5 knots (momentary deviations excepted).
- The aircraft is in the correct landing configuration.
- Sink rate is no greater than 1,000 feet per minute. If an approach requires a sink rate greater than 1,000 feet per minute, the target sink rate as briefed in the approach briefing will be the maximum sink rate.
- Thrust setting is appropriate for the aircraft configuration and is not at idle power. The criteria above will be met and checked by the following windows:
- 1,000 feet AGL if the weather is at or below 1000/3.
- 500 feet AGL if the weather is above 1000/3.
- 300 feet AGL in the VFR pattern or during a circling approach.
- If an approach becomes unstable below these altitudes, the crew will initiate a go-around and missed approach.

It may not be possible to achieve stabilized approach criteria during certain types of approaches (emergency procedures, steep approaches/arrivals, etc.). In these cases, time permitting, the PIC will thoroughly brief go around considerations for the approach to be flown.

In no case will pilots attempt to “save” or salvage a poor approach unless the possibility of a go around presents a greater risk than continuing to land.

STABILIZED APPROACH BENEFITS

Stabilized Approaches provide the following benefits:

1. **As close to accurate reference to the demonstrated landing numbers**
2. **Minimizes the amount of float and time in the flare**
3. **Ensures consistent handling throughout the whole landing phase**
4. **Ability to recognize adverse trends before it's too late to take appropriate action (leaving no outs)**

INCORPORATION OF STABILIZED APPROACH CONCEPTS

Begin incorporating these ideas into your operations:

- *Brief the entire arrival phase: from STAR to Approach, to rollout, to taxi, prior to descent from cruise*
- *Become familiar with the local area and have an alternate airport within easy flying distance in case of increased landing distance factors*
- *This only works if you, the pilot, continues to incorporate this in every flight and decision you make*

SIGHT PICTURE CORRELATION

Landing an airplane and using a wheelbarrow are identical

04

ELEMENTS OF PROPER SIGHT PICTURE

- *Back to basics*
  - *Alignment*
    - *Centerline alignment could give you an indication of crosswind*
  - *Attitude*
    - *Ensuring proper control inputs given current conditions*
  - *Airspeed*
    - *Throttle Control*
    - *Stabilized Approach=consistent airspeed*
- *Do not stop flying the airplane*
  - *Once the control inputs are in, do not remove them*
  - *Maintain inputs until the aircraft is at taxi speeds*
- *Creates the proper tempo for control inputs*
  - *Timing is critical for a smooth, safe landing in the Hondajet*

SIGHT PICTURE CORRELATION (CONTINUED)

PFD Indications (Inside)

Outside Visual References

THE HONDAJET IS A WHEELBARROW

Proper input techniques are necessary to create a proper sight picture

- *Prompt corrective control inputs may be necessary depending on wind gust(s)*
- *Do not stop flying the airplane!*
- *When in doubt, go around!*

FLARE & ROLLOUT

Fly the airplane to a stop

05

FLARE TIMING AND TEMPO

- *Timing is everything with the HA-420*
- *The following conditions are assumed*
  - *Aircraft is fully configured, stabilized approach*
  - *Ref within 5 knots, aligned and on glide path*
    - *Approaching airport boundary fence:*
    - *Pilot Flying begins to reduce thrust on the airplane*
    - *Pilot Flying should be at idle thrust when the “50” alert sounds*
    - *Pilot Flying waits to begin flare until 15-20 AGL*
    - *Useful visual indicators are the aiming point markers*
    - *Slight pitch up until aircraft touches down*

WINGS LEVEL THROUGH FLARE AND ROLLOUT

It is imperative the Pilot Flying continue to maintain appropriate aileron input to maintain a ”wings-level” attitude.

Should the pilot flying fail to maintain wings level, it can create pilot induced directional control oscilations on the runway

This will create a tendency to want to apply assymetric braking, which will further exacerbate the problem

FLY THE AIRPLANE TO A STOP

Key takeaways

- *Airplane handles like a taildragger in regard to stick and rudder skills, not a jet. Keep stick and rudder skills sharp, and use every opportunity to hand fly the airplane*
- *Under no circumstances should the pilot ever remove crosswind control inputs: the upwind wing will begin to lift*
- *Proper sight picture allows for equal weight and pressure to be applied to the main wheels, thereby creating maximum effective braking effeciency*

QUESTIONS AND ANSWERS

&Acknowledgements

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ACKNOWLEDGEMENTS

- *Matt Liotta and the Senior Leadership Team at Volato*
- *Patrick Moran and his unwavering commitment to safety*
- *Josh Newsteder: Volato's VP of Flight Operations and continued guidance*
- *Azim Sumar: friend, mentor, brother, and the first person I got to learn about the Honda from*
- *Steve Brady: whose assistance and guidance cannot be valued by any form of money*
- *Brianne Kroupa: our OCC Manager, friend, and their entire department and the myriad of conflicting demands to which they pull miracles off daily*
- *All of the inaugural attendees today: without you, and continued desire to see the HondaJet succeed, soar, and operate safely. We cannot do this without you: Thank you!*

Volato

ENJOY FLYING MORE