Helicopter Safety Enhancement (H-SE) Number 124: Improve Understanding of Basic Helicopter Aerodynamics	
Safety Enhancement Action:	Training: FAA and industry to review and revise materials explaining basic helicopter aerodynamics to emphasize recognition of unsafe aerodynamic situations and apply appropriate corrective actions.
Expected Implementers:	• USHST Special Emphasis Area (SEA) Training Team • Helicopter Association International (HAI) Training Committee (TC) • FAA AFS-800 • FAA Safety Team (FAAST)
Statement of Work:	Within the LOC-I, UIMC, and LALT dataset of 52 fatal accidents from 2009–2013, the USHST reviewed two (2) fatal accidents that resulted from pilots failing to recognize and appropriately recover from unsafe aerodynamic situations, including vortex ring states, low RPM rotor stalls, and low G mast bumping. The USHST identified that all three of these situations are either incorrectly or inadequately discussed in the Helicopter Flying Handbook (FAA-H-8083-21A), the Helicopter Instructor's Handbook (FAA-H-8083-4), and FAA advisory circulars. Accordingly, the USHST recommends a thorough review of existing FAA materials, followed by a revision and promotional campaign, including seminars, advisory circulars, and airmanship bulletins. Project: 1. FAA and industry to review the Helicopter Flying Handbook (FAA-H-8083-21A) and Helicopter Instructor's Handbook (FAA-H-8083-4) and pertinent Advisory Circulars to assess explanations of unsafe aerodynamic situations and provide recommendations for revisions. 2. FAA to revise the Helicopter Flying Handbook and Helicopter Instructor's Handbook and pertinent Advisory Circulars concerning unsafe aerodynamic situations, to include vortex ring state, low G mast bumping, and low RPM rotor stall guidance. 3. FAA to issue advisory circular on the Vuichard Recovery Technique from vortex ring state. 4. FAA to revise AC 61-83, as amended (Nationally Scheduled, FAA-Approved, Industry-Conducted Flight Instructor Refresher

	Course) to add critical helicopter aerodynamics to the core topic list. 5. USHST SEA Training Team to develop presentations/promotional materials regarding identification of and response to vortex ring state, low RPM rotor stall, and low G mast bumping for use by the training community. The following fatal accidents prompted this safety enhancement. ERA11FA272 ERA09FA497
Relation to Current Aviation Community Initiatives:	• Rotorcraft Airman Certification System (ACS) (pending at time of H-SE drafting). • Special Federal Aviation Regulation (SFAR) 73 (Robinson R-22/R-44 special training) to 14 C.F.R. Part 61. • H-SEs 122 and 37. • Other USHST H-SEs (37 and 115_128) also plan to recommend revisions to some of the same FAA Handbooks referenced in H-SE 124. Submission of revisions from each H-SE must be closely coordinated together to ensure consistency of recommendations. There is a benefit to aligning all of them for a single, collective submission with the goal to have all recommendations incorporated during a single revision cycle of the handbooks.
Performance Goal Indicators:	• Advisory Circular on Vuichard Recovery Technique from vortex ring state published. • FAA-H-8083-21A and FAA-H-8083-4 revised. • Promotional materials for improved training of aerodynamic factors generated.

Key Milestones:	<table><tr><th></th><th>Total Months</th><th>Start Date</th><th>End Date</th></tr><tr><td>Output 1:</td><td>24</td><td>Oct. 1, 2017</td><td>Oct. 1, 2019</td></tr><tr><td>Output 2:</td><td>24*</td><td>Oct. 1, 2019</td><td>Oct. 1, 2021</td></tr><tr><td>Output 3:</td><td>12*</td><td>Oct. 1, 2021</td><td>Oct. 1, 2022</td></tr><tr><td>Output 4:</td><td>6*</td><td>Oct. 1, 2022</td><td>Apr. 1, 2023</td></tr><tr><td>Output 5:</td><td>12</td><td>Apr. 1, 2023</td><td>Apr. 1, 2024</td></tr></table> **Completion: 78 months** **If Outputs 2, 3, and 4 can be done in parallel, completion is possible in 60 months.*
Potential Obstacles:	• FAA procedural delays, including coordinating Handbook updates with other H-SEs recommending Handbook revisions. • Financial resources to create materials.
Detailed Implementation Plan Notes:	
CICTT Code:	LOC-I
Output 1:	
Description:	Review the Helicopter Flying Handbook (FAA-H-8083-21A), Helicopter Instructor's Handbook (FAA-H-8083-4) and pertinment ACs to assess explanations of unsafe aerodynamic situations and provide recommendations for revisions.
Lead Organization:	FAA AFS-800
Supporting Organizations:	• USHST SEA Training Team • HAI Training Committee
Actions:	The FAA, USHST SEA Training Team, and HAI Training Committee to collaborate on recommendations for revising the content in the Helicopter Flying Handbook and Helicopter Instructor's Handbook concerning unsafe aerodynamic situations.
Output Notes:	The FAA, USHST, and HAI should consult selected DPEs, flight schools, and instructors for input on the suggested revisions to the Handbooks.
Time Line:	24 months

Target Completion Date:	October 1, 2019
Output 2:	
Description:	Revise to the Helicopter Flying Handbook, Helicopter Instructor's Handbook and pertinent ACs concerning unsafe aerodynamic situations, to include vortex ring state, low G mast bumping, and low RPM rotor stall guidance.
Lead Organization:	FAA AFS-800
Supporting Organizations:	USHST SEA Training Team
Actions:	The FAA should use the recommendations from Output 1 to initiate and complete revisions to the Helicopter Flying Handbook, Helicopter Instructor's Handbook and pertinent ACs.
Time Line:	24 months
Target Completion Date:	Oct. 1, 2021
Output 3:	
Description:	Publish advisory circular on the Vuichard Recovery from the vortex ring state.
Lead Organization:	FAA AFS-800
Supporting Organizations:	USHST SEA Training Team
Actions:	The FAA to coordinate with the USHST SEA Training Team to adapt the USHST's Airmanship Bulletin on the Vuichard Recovery into an advisory circular.
Time Line:	12 months
Target Completion Date:	Oct. 1, 2022
Output 4:	
Description:	Revise AC 61-83 (Nationally Scheduled, FAA-Approved, Industry-Conducted Flight Instructor Refresher Course) to add critical helicopter aerodynamics to the core topic list.
Lead Organization:	FAA AFS-800
Supporting Organizations:	USHST SEA Training Team

Actions:	1. The FAA to coordinate with the USHST SEA Training Team to revise AC 61-83 to include helicopter critical aerodynamic state recognition and recovery information. 2. The FAA to release an updated advisory circular.
Time Line:	6 months
Target Completion Date:	Apr. 1, 2023
Output 5:	
Description:	Develop presentations/promotional materials regarding identification of and response to vortex ring state, low RPM rotor stall, and low G mast bumping for use by the training community.
Lead Organization:	USHST SEA Training Team
Supporting Organizations:	FAAST
Actions:	1. USHST SEA Training Team to develop materials for the training of industry on identification of and response to vortex ring state, low RPM rotor stall, and low G mast bumping, including PowerPoint presentations. 2. USHST SEA Training Team to conduct outreach to distribute materials to training community.
Output Notes:	USHST SEA Training Team should consult selected DPEs, flight schools, and instructors for input on content and most useful format.
Time Line:	12 months
Target Completion Date:	Apr. 1, 2024