

National Transportation Safety Board

Washington, DC 20594



Response to Petition for Reconsideration

July 24, 2026

Mr. Joshua Gang
General Counsel and Corporate Secretary
Piper Aircraft
2926 Piper Drive
Vero Beach, FL 32960

In accordance with Title 49 *Code of Federal Regulations (CFR)* Part 845.32, the National Transportation Safety Board (NTSB) has reviewed the petition for reconsideration and modification of probable cause of the March 23, 2022, aviation accident involving a Piper PA-46-600TP airplane near Olive Branch, Mississippi (CEN22LA153). The petitioner has met the requirements for the NTSB's review of their petition; specifically, as the airplane manufacturer and a party to the investigation, Piper Aircraft has a direct interest in the investigation and has offered claims that our report was erroneous. Based on our review of the petition filed on August 7, 2023, the NTSB grants the petition in part.

On March 23, 2022, at 1038 central daylight time, a Piper PA-46-600TP (M600) airplane, N627PR, was substantially damaged when it was involved in an accident near Olive Branch, Mississippi. The pilot and passenger were not injured. The airplane was operated as a Title 14 *CFR* Part 91 personal flight.

The probable cause of the accident, approved on March 22, 2023, was as follows: "The airplane's uncommanded hard right turn and loss of directional control during landing in crosswind conditions. Contributing to the accident were the dynamic instability of the nose landing gear and the crosswind conditions."

Background

The pilot was landing the airplane with a right quartering headwind, resulting in a right crosswind component of about 10 to 14 kts, which was less than but near the airplane's maximum demonstrated crosswind component of 17 kts. The airplane touched down left of runway centerline. After touchdown, the pilot attempted to correct to the right toward the centerline with rudder inputs.

As the airplane decelerated through about 68 kts and approached the runway centerline, the airplane entered a 45° hard right turn, and the pilot reported that he was unable to control the turn with left rudder input. The airplane departed the right side of the runway, about 1,330 ft from the threshold and about 570 ft after touchdown, and the nose landing gear collapsed. The airplane sustained substantial damage to the engine mount.

Petitioner's Claims

The petitioner asserts that the NTSB's analysis, findings, and probable cause are erroneous and that neither an uncommanded turn occurred nor did the design of the nose landing gear contribute to the accident. Rather, the petitioner claims that the pilot lost directional control of the airplane due to his failure to apply appropriate crosswind landing techniques. Specifically, the petitioner asserts:

- 1) There is no factual evidence of an uncommanded right turn after touchdown.
- 2) The evidence establishes the absence of a dynamic instability in the nose landing gear.
- 3) The final report has no analysis of pilot performance other than relying on the pilot's statements, which are inconsistent with the objective evidence.
- 4) The final report misrepresents work cited in the report related to airplane nose gear design.
- 5) NTSB communications with the accident pilot indicate confirmation bias played a role in the investigation, which led to the erroneous analysis, findings, and probable cause.¹

As new evidence to support their claims, the petitioner provided: a third-party report that offers an alternative analysis of the accident's factual data and criticizes the NTSB's use of the term "dynamic instability"; the curriculum vitae of the third-party report's author; and copies of written communications among the accident pilot, an insurance adjuster, an NTSB airworthiness subject-matter expert assigned to the investigation, and a representative of an aviation sales and service company.

NTSB's Response

The NTSB reviewed the original case material, the petition, and new evidence provided by the petitioner supporting their claims. The NTSB also conducted

¹ *Confirmation bias* is "the seeking or interpreting of evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand." (Nickerson, Raymond S. 1998. "Confirmation Bias: A Ubiquitous Phenomenon in Many Guises." *Review of General Psychology* 2 (2): 175-220.)

additional research, which is documented in the attached report (*Piper PA46 Runway Excursions Study*). This research included simulation of the accident landing roll and similar events, review of other runway excursion events in PA-46 and similar airplanes, assessment of nose landing gear geometry and its effect on directional stability, clarification of terminology used in the original investigation report and by the petitioner to describe stability, and review of literature relevant to PA-46 nose landing gear design, maintenance, and handling qualities.

"Uncommanded" Right Turn

The petitioner asserts that there is no factual evidence of the airplane's uncommanded right turn after touchdown. Specifically, the petitioner states that "the only evidence of an uncommanded turn is from the subjective statements of the pilot" and "the photographic evidence conclusively contradicts" these statements. The petitioner further cites the pilot's actions as described in the original final report ("the pilot was correcting back to the centerline of the runway with rudder input") as evidence that the pilot likely commanded the right turn.

The NTSB acknowledges that the investigation was unable to determine with certainty the source of the steering inputs (that is, whether they were commanded by the pilot via the rudder pedals, the result of ground reaction forces on the tire, or a combination), as the recorded data did not include rudder pedal positions or control forces. Our review of photographic evidence collected in this investigation, including rubber transfer marks on the runway, found that the evidence was consistent with a hard right turn after touchdown.

We performed several simulations of the landing roll; comparison of the simulation results to recorded avionics data showed that the hard right turn was consistent with the nose landing gear deflecting to its maximum turn angle in about 3 seconds after touchdown. Given the pilot's experience flying both free-castering and steerable nosewheel airplanes, we find it unlikely that the pilot input full right rudder in his attempt to align the airplane with the runway centerline during the landing roll.

As discussed in the attached study, the design of the accident airplane's nose landing gear, with its 90° rake angle (0° caster angle) and lack of offset, requires positive pneumatic trail for directional stability. Directional instability can result if the nose landing gear is operated outside of tight maintenance and operational parameters.² Further, our review of runway excursion events in PA-46 and similar airplanes showed that the PA-46 (with the nose landing gear design present in the accident aircraft) was overrepresented in events in which the pilots involved

² The parameters include rake/caster angle, tire pressure, rudder cable tension, and steering arm/horn roller clearance.

complained of or recorded data indicated an airplane “veer” following NLG touchdown.³

Thus, the NTSB continues to believe it unlikely that the hard right turn was solely commanded by the pilot. However, after conducting additional landing roll simulations and researching factors affecting nose landing gear directional stability (as described in the attached study), we find that the evidence is consistent with an adverse airplane-pilot coupling event, in which the airplane likely responded in an unexpected way to the pilot’s control inputs, and the combination of the pilot’s inputs and the airplane’s response led to a loss of control. We also find it likely that the directional stability of the nose landing gear, which was sensitive to operational conditions and adherence to maintenance tolerances (as demonstrated by several Piper customer information letters, service letters, and service bulletins listed in the study), contributed to the accident. The factual information, analysis, and probable cause in the original final report have been revised to reflect this.

Dynamic Stability/Directional Stability

Regarding the petitioner’s claim that the evidence establishes the absence of a dynamic instability in the nose landing gear, we believe a review of terms would be useful.

Aircraft stability is typically described using the terms *static stability* and *dynamic stability*. Static stability refers to the initial motion of an object after being disturbed. An object has *positive static stability* if it initially returns toward a state of equilibrium when disturbed, *neutral static stability* if it remains in its disturbed state, and *negative static stability* (or static instability) if it initially deviates further from equilibrium. In contrast, dynamic stability refers to the behavior of an object over time after being disturbed. An object has *positive dynamic stability* if it oscillates with decreasing amplitude about a state of equilibrium after being disturbed, *neutral dynamic stability* if the oscillations continue unchanged, and *negative dynamic stability* (or dynamic instability) if the oscillations grow in amplitude over time. Using these definitions, positive static stability is a requirement for positive dynamic stability.

However, the original final report uses the term “dynamic stability” to indicate whether the forces acting on the nose landing gear when the aircraft is taxiing forward will cause the nosewheel to return to a centered position (positive dynamic stability) or further increase the turn angle (negative dynamic stability). As noted in the attached study, this definition appears consistent with the literature regarding nose landing gear design and the use of the term by Piper, which stated in a 2008 customer information letter that “a rake angle outside of [the 90.0 to 90.5 degree]

³ In this context, “veer” is defined as an abrupt, surprising, and undesired deviation of the airplane’s heading away from the runway heading that risked or resulted in the airplane crossing over a runway edge.

range may result in dynamic instability, creating steering forces that exceed the pilot's ability to control."

To clarify the original final report's discussion, it has been revised to remove references to static and dynamic stability. Instead, the term "directional stability" is used to describe the behavior of the landing gear when disturbed from a centered position while the airplane is rolling forward. In addition, the concept of "trail," and its relation to rake angle and caster angle, has been expanded to include static trail, dynamic trail, and pneumatic trail.

Pilot Performance

Regarding the petitioner's claim that the NTSB's analysis of the accident pilot's performance relied solely on the pilot's statements and that these statements are inconsistent with objective evidence, the NTSB does not concur.

The petitioner posits that the pilot "resorted to his past experience with a castering nose gear and failed to operate this aircraft properly." We note, however, that the pilot also had past experience operating other aircraft with steerable nose landing gear. The original final report has been updated to reflect this information that was obtained as part of the original investigation and is recorded in the investigation's docket.

As stated above ("*Uncommanded*" *Right Turn* section), we find that the pilot's statements about his landing performance were consistent with the rubber transfer marks on the runway, which indicated that the nosewheel was initially centered at touchdown in accordance with proper crosswind landing technique for airplanes with steerable nose landing gear.

Misrepresented Work

Regarding the petitioner's claim that work related to airplane nose gear design was misrepresented in the final report, the NTSB does not concur.

The petitioner asserts that it was inappropriate for the NTSB to use figure 6 in the original final report to illustrate concepts related to PA-46 nose landing gear stability because that figure (as it originally appeared in the source material) represented castering nose landing gear systems. The NTSB notes, however, that nose landing gear stability is a property of the landing gear geometry and is independent of the manner by which the landing gear is controlled. Thus, we believe that figure 6 was used appropriately to illustrate several nose landing gear geometries (and their resultant directional stability) and is applicable to the PA-46. Nevertheless, in revising the original final report to clarify nose landing gear directional stability (as described above in *Dynamic Stability/Directional Stability*), the text surrounding figure 6 has been revised so that figure 6 is only used to illustrate

several nose landing gear geometries and the concept of “mechanical trail” rather than their directional stability.

The petitioner further asserts that the discussion of nose landing gear stability in the “Tests and Research” section of the original final report contains errors regarding the stability of various nose landing gear configurations shown in figure 6. We believe that the petitioner’s concerns are related to the ambiguous use of the term “dynamic instability” as noted above. However, in revising the original final report to clarify nose landing gear directional stability, the references to the directional stability of each nose landing gear configuration shown in figure 6 have been removed.

Confirmation Bias

Regarding the petitioner’s claim that confirmation bias led to errors in the analysis, findings, and probable cause, the NTSB does not concur.

As evidence to support this claim, the petitioner provided an email chain that begins with a message from the accident pilot to the NTSB Airworthiness Group Chair for this investigation, in which he thanked the Group Chair for a previous telephone discussion and conveyed analytical information about the accident. This is followed by a message from an insurance adjuster to the Airworthiness Group Chair, in which the adjuster asked the Group Chair to verify the analysis in the accident pilot’s email. The Group Chair then replied to the adjuster with factual information about the accident and the status of the investigation. The email chain ends with a message from the accident pilot to an aviation sales and service company, in which the pilot related additional details of his conversation with the Airworthiness Group Chair, stated his own beliefs as to the probable cause of the accident, and requested that the company work with Piper to repair his airplane at Piper’s expense.

The petitioner asserts that the accident pilot’s description of his conversation with the Airworthiness Group Chair indicates confirmation bias on the part of the Group Chair, that this bias resulted in a flawed investigation, and that the Group Chair “made a determination as to the probable cause and contributing factors well before the investigation was complete.”

The NTSB believes that the pilot’s description of his communications with the Airworthiness Group Chair, which implies analysis was shared before adoption of the final report, is concerning. However, the Group Chair was not responsible for determining probable cause, and the Group Chair stated this to the insurance adjuster. As the Group Chair accurately detailed, he would write an engineering report to support the investigation, but the investigator-in-charge would write the final report, and “the Board will determine probable cause based on the facts and circumstances that we as the staff document in our reports.”

Additionally, the petitioner takes issue with the Airworthiness Group Chair's statements to the insurance adjuster that "there was nothing abnormal noted during the preliminary review" of the landing and "the runway markings show the airplane tracking straight with the nosewheel rolling before it suddenly departs to the right." The petitioner believes that this shows the Group Chair "had already determined the probable cause of the accident and was focused solely on the design of the PA-46 nose landing gear while discounting or ignoring any evidence of pilot error."

We note that these statements from the Group Chair were factual rather than analytical and were consistent with the type of information included in NTSB preliminary reports and other public communications that the NTSB may issue during an ongoing investigation. Moreover, it is appropriate and expected that the Airworthiness Group Chair would focus solely on airworthiness issues as one part of a broader, comprehensive accident investigation. Therefore, the original final report has not been revised based on the petitioner's claim of confirmation bias.

Disposition

After review of the evidence, the petition for reconsideration of the NTSB's final report in connection with the aviation accident involving a Piper PA-46-600TP near Olive Branch, Mississippi, is granted in part. The aviation accident final report has been modified as shown in the attachment.

Chairwoman HOMENDY, Vice Chairman GRAHAM, and Members CHAPMAN and DELEEUEW concurred in the disposition of this petition for reconsideration.

Attachments

Revised final report
Piper PA46 Runway Excursions Study