Runway Guard Lights Survey

Clark Calabrese, Alexa D'Adamo

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List of Abbreviations

Abbreviation	Term
AAAE	American Association of Airport Executives
AAL	Alaska
AEA	Eastern
ACE	Central
AGL	Great Lakes
ALPA	Air Line Pilots Association
ANE	New England
ANM	Northwest Mountains
AOPA	Aircraft Owners and Pilots Association
ASO	Southern
ASW	Southwest
AWP	Western Pacific
ERGLs	Elevated Runway Guard Lights
FAA	Federal Aviation Association
NBAA	National Business Aviation Association
NAFI	National Association of Flight Instructors
NAS	National Airspace System
RAA	Regional Airline Association
RGLs	Runway Guard Lights
SSIT	Surface Safety Initiatives Team

1. Introduction

The Federal Aviation Administration (FAA) NextGen Technology Development and Prototyping Division (ANG-C5) sponsored the current work in order to explore the use of Runway Guard Lights (RGLs) as a runway incursion mitigation tool. A runway incursion 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 takeoff of aircraft[1]". Runway incursion events continue to be a safety concern in the National Airspace System (NAS). FAA employs a data-driven approach to identify runway safety technologies that may help to solve runway incursion problems at specific areas of concern. One of the most common traffic scenarios occurring during a runway incursion is the unauthorized crossing of a hold-short line. RGLs are designed to prevent runway incursions in this scenario.

RGLs consist of flashing yellow lights installed at the runway-taxiway intersection. They may be either embedded or elevated. Embedded RGLs consist of a row of in-pavement yellow lights installed across the entire taxiway, at the runway holding position marking (see Figure 1). Elevated RGLs (or "wig-wag" lights) consist of a pair of elevated flashing yellow lights installed on either side of the taxiway near the holding position sign (see Figure 2). Both are designed to be visual aids for identifying the runway hold-short line and provide pilots and airport vehicle drivers with an indication that they are approaching an active runway. They are primarily used to enhance the conspicuity of taxiway-runway intersections during low visibility conditions but may be used in all weather conditions. It is recommended that RGLs not be operated when the associated runway is closed to landing and takeoff operations.

Figure 1. Embedded Runway Guard Light

Figure 2. Embedded Runway Guard Light

FAA is exploring the expanded use of RGLs as a lower cost method of preventing runway incursions. It wishes to determine which type of RGLs are most effective and in what circumstance. As a result, the

[1] Runway Incursions | Federal Aviation Administration (faa.gov)

Volpe National Transportation Systems Center, in partnership with the FAA, explored the use of RGLs as a runway incursion mitigation tool on the airport surface to prevent these unauthorized hold short line crossings. A survey was designed and deployed to collect data to pilots and airport vehicle drivers all over the country who encounter RGLs. The data from this survey will be used to inform the decision-making process for future runway incursion mitigation tool investments and the expanded use of RGLs. The Volpe Center stored and analyzed the raw data collected from this survey and provided the aggregated results and recommendations in this report.

2. Method

The purpose of the survey was to collect information from the sample population of pilots and airport vehicle drivers who encounter RGLs while operating in the movement area. Survey items were written by Volpe in coordination with the Surface Safety Initiatives Team (SSIT) working group. Survey content included demographics, past experience operating on the airport surface and encountering RLGs, whether RGLs provide operators with an awareness of hold short lines in the movement area, how that awareness may affect runway incursions, in which operating conditions, and any differences between embedded and elevated guard lights and the effectiveness of these lights for indicating the presence of a hold short line. There were 21 items on the survey, although the number of questions that a given participant would see varied; the survey was designed with a branching logic based on responses to certain items. There was a combination of multiple-choice items and short answer items. See Appendix A for the full text of the survey.

The electronic version of the survey was developed on the Survey Monkey platform. In March 2021 and was send out by FAA electronically to all participants. FAA identified several organizations representing pilots and drivers with experience operating in the airport movement environment through which they could recruit survey participants. Participating organizations included the National Association of Flight Instructors (NAFI), National Business Aviation Association (NBAA), Regional Airline Association (RAA), Aircraft Owners and Pilots Association (AOPA), Air Line Pilots Association (ALPA) and the American Association of Airport Executives (AAAE). FAA sent out two waves of surveys. In March 2021, surveys were sent to members of NAFI, NBAA, RAA and AOPA. A total of 367 responses were received during this first wave. A second wave of surveys was sent out in September 2021, to ALPA and AAAE. The final response rate after the survey was closed was 707 total responses. Participation in this survey was voluntary and the information collected was anonymous.

3. Results

A total of 707 participants responded to the survey. Survey participants were experienced with the runway environment (mean=16.71 years, SD=13.06 years). The survey was answered by pilots and vehicle drivers that work across the National Airspace System (NAS). Participants were asked to list the airports at which they operated. Responses were summarized by FAA Region (Figure 3). A participant could list more than one airport, so the number of airports listed was greater than the total number of survey participants. Responses included airports from all FAA regions, with the largest proportion of participants operating in the Western Pacific and Southern regions.

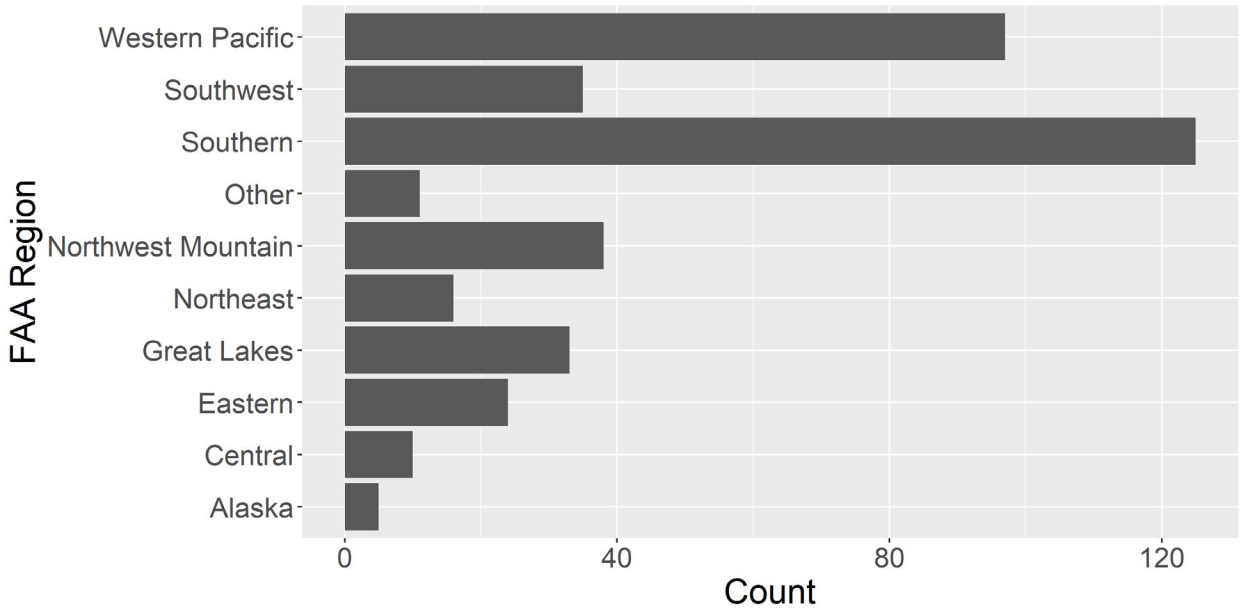

Figure 3. Number of Responses by FAA Region

Survey participants were primarily pilots (80%), with some vehicle operators (20%). Participants were asked how frequently they operated in the movement area. The majority of participants operated in the movement area at least once a week (Table 1). Participants were also asked how long they have been operating in the movement area; on average, they had 16.7 years of experience (Table 2). Most participants (63%) had a decade or more of experience operating in the movement area.

Table 1. How frequently do you operate in the movement area?

	Aircraft	Vehicles	Overall
Daily	37%	60%	41%
Weekly	48%	20%	42%
Monthly	11%	13%	11%
Quarterly	3%	3%	3%
Yearly	1%	4%	2%

Table 2. How many years have you been operating in the movement area?

	Aircraft	Vehicles	Overall
Mean	17.1	15.2	16.7
SD	13.6	10.7	13.1

Vehicle drivers tended to operate in the movement area more frequently than pilots, with the majority of drivers (60%) reporting operating in the movement area daily. Both pilots and vehicle drivers had similar levels of experience with operating in the movement area (mean 17.1 years and 15.2 years) respectively.

The majority of participants had knowledge of RGLs prior to taking this survey (91%) and had encountered them while operating in the movement area (77%). See Table 3 and Table 4 respectively for details. Most had knowledge of both embedded and elevated RGLs (78%). Furthermore, most drivers

reported that RGLs/wig wags were part of their vehicle driver training course (68%). The survey did not include questions about pilot training.

Table 3. Did you have knowledge of runway guard lights prior to taking this survey?

	Aircraft	Vehicles	Overall
No	8%	11%	9%
Elevated	3%	8%	4%
Embedded	11%	5%	10%
Both	78%	75%	78%

Table 4. Have you encountered runway guard lights (i.e., wig-wags) while operating in the movement area?

	Aircraft	Vehicles	Overall
No	13%	24%	15%
Unsure	9%	3%	8%
Yes	78%	73%	77%

The survey logic branched based on the participants response to the item about past experience encountering RGLs while operating in the movement area. For the 159 participants who *had not* previously encountered RGLs, they were asked whether they thought installing RGLs would heighten awareness of hold short lines for runway incursion prevention. Most agreed (75%), while some disagreed (15%) or were unsure (10%). For these participants, the survey concluded after this item.

For the 527 participants who *had* previously encountered RGLs, they were asked which types of RGLs they had previous encountered. Some had encountered only elevated RGLs (10%) or only embedded RGLs (9%), but most had encountered both types (81%). The remainder of the survey questions presented to participants varied based on which types of RGLs they had previously encountered. A participant was only asked about a specific type of RGL if they had reported encountering that type of RGL in the past. The results from this point on only reflect the relevant participants, so sample sizes may vary from item to item. For example, results summarizing an item about elevated RGLs specifically would include participants who reported experience with elevated RGLs or both types of RGLs but would exclude participants who only report experience with embedded RGLs or neither type. In total, 477 participants had encountered elevated RGLs, and 469 participants had encountered embedded RGLs. These two numbers both include in their totals the participants who reported previously encountering both embedded and elevated RGLs.

Nearly all participants reported that RGLs were likely to increase their awareness of the presence of a hold short line (Table 5; Figure 4). On average, embedded RGLs were rated more likely to increase awareness. The 469 participants who had encountered embedded RGLs (M = 4.63, SD = 0.63) rated them more likely than the 477 of the participants who had encountered elevated RGLs (M = 4.45, SD = 0.68) to increase their awareness of a hold short line ($t(822.4) = -3.63$, $p = <0.001$).

Table 5. How likely are runway guard lights (i.e., wig-wags) to increase your awareness of the presence of a hold short line?

	Embedded		Elevated	
	Count	Frequency	Count	Frequency
Very likely	284	69%	223	54%
Likely	111	27%	160	39%
Neither likely nor unlikely	13	3%	29	7%
Unlikely	3	1%	1	0%
Very unlikely	2	0%	2	0%

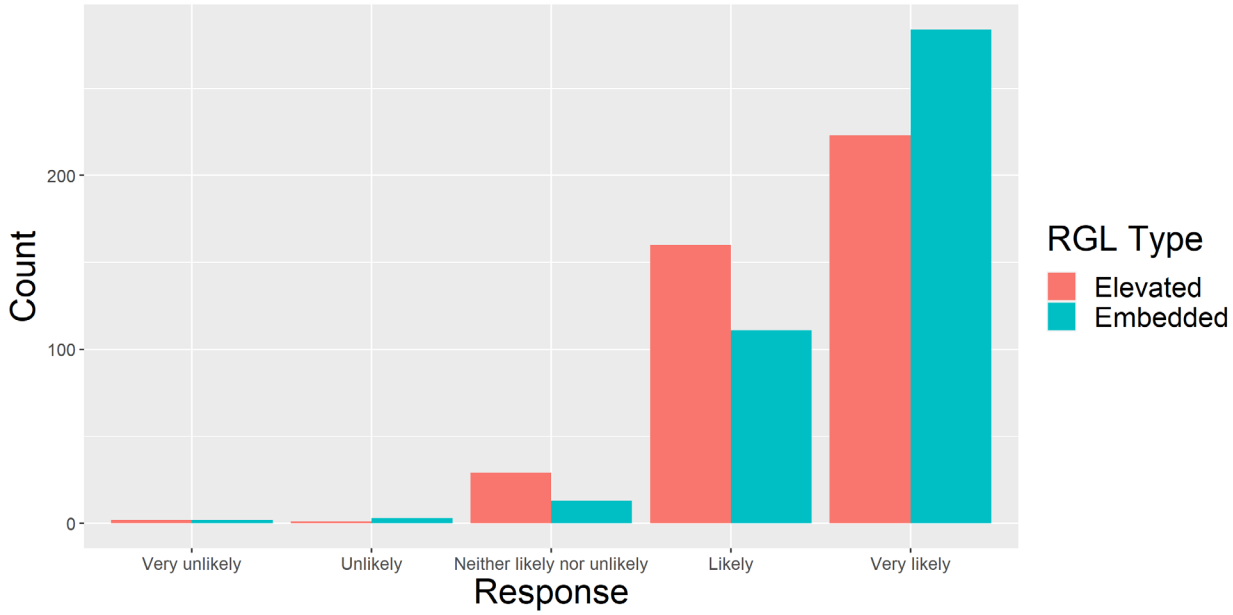

Figure 4. How likely are runway guard lights (i.e., wig-wags) to increase your awareness of the presence of a hold short line?

Participants were asked when RGLs were most beneficial (Table 6; Figure 5). The pattern of responses was similar for both embedded and elevated RGLs: they were most beneficial for night operations, followed in descending order by low visibility operations, unfamiliar airports and complex airport geometry. They were the least beneficial during day operations and high traffic periods.

A significantly higher proportion of participants considered embedded RGLs (79%) to be beneficial for night operations compared to elevated RGLs (70%) (χ^2 (1) = 10.31, $p < 0.01$). A significantly higher proportion of participants considered elevated RGLs (37%) to be beneficial for day operations compared to embedded RGLs (23%) (χ^2 (1) = 22.219, $p < 0.001$). Otherwise, there were no significant differences between the proportion of participants who considered elevated and embedded RGLs beneficial in these scenarios.

Table 6. When do you consider runway guard lights to be most beneficial? Select all that apply.

	Embedded		Elevated	
	Count	Frequency	Count	Frequency
Low Visibility Operations	331	47%	315	45%
Night Operations	372	53%	334	47%
Day Operations	108	15%	178	25%
High Traffic Period	119	17%	143	20%
Complex Airport Geometry	262	37%	259	37%
Unfamiliar Airport	276	39%	285	40%

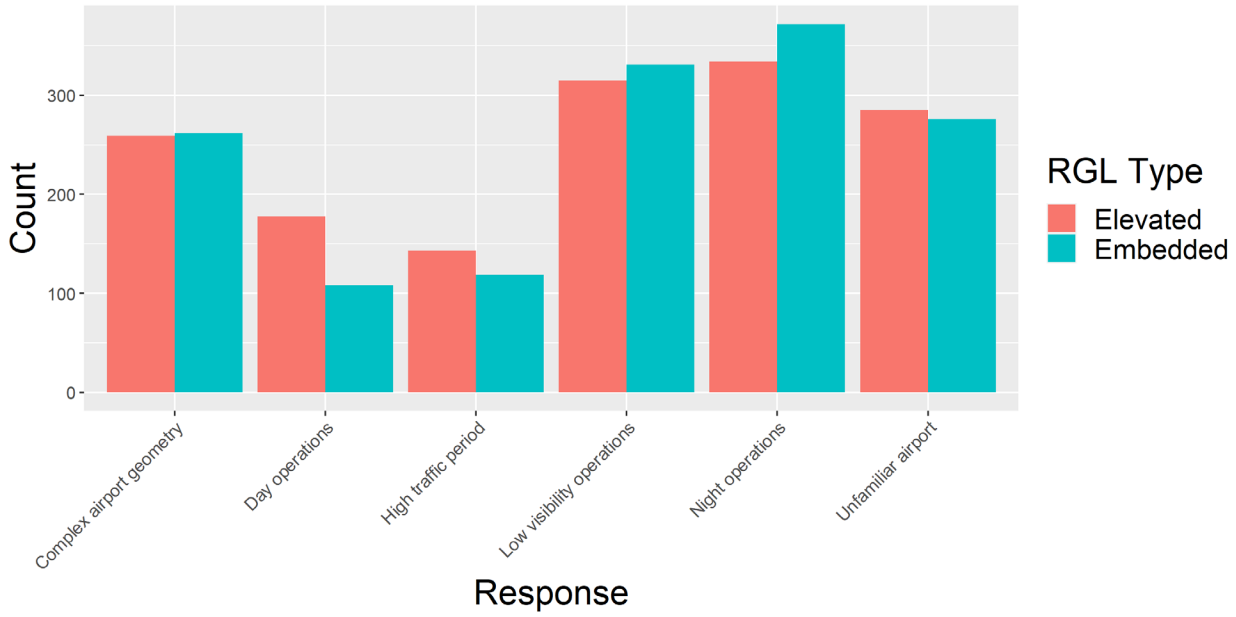

Figure 5. When do you consider runway guard lights to be most beneficial? Select all that apply.

Nearly all participants reported that both types of RGLs are visible from an adequate distance in order to be able to stop before crossing a hold short line (Table 7; Figure 6). There was no significant difference between ratings of embedded and elevated RGLs. The 469 of the participants who had encountered embedded RGLs (M = 3.49, SD = 0.63) rated them the same as the 477 of the participants who had encountered elevated RGLs (M = 3.51, SD = 0.63) in terms of visibility before crossing the hold short line (t (825.9) = 0.33, p = 0.74).

Table 7. When approaching a hold short line, are runway guard lights visible from an adequate distance to be able to stop the vehicle/aircraft before crossing the hold-short line?

	Embedded		Elevated	
Variable	Count	Frequency	Count	Frequency
No, rarely	1	0%	2	0%
Only sometimes	28	7%	24	6%
Yes, always	234	57%	239	58%
Yes, usually	150	36%	150	36%

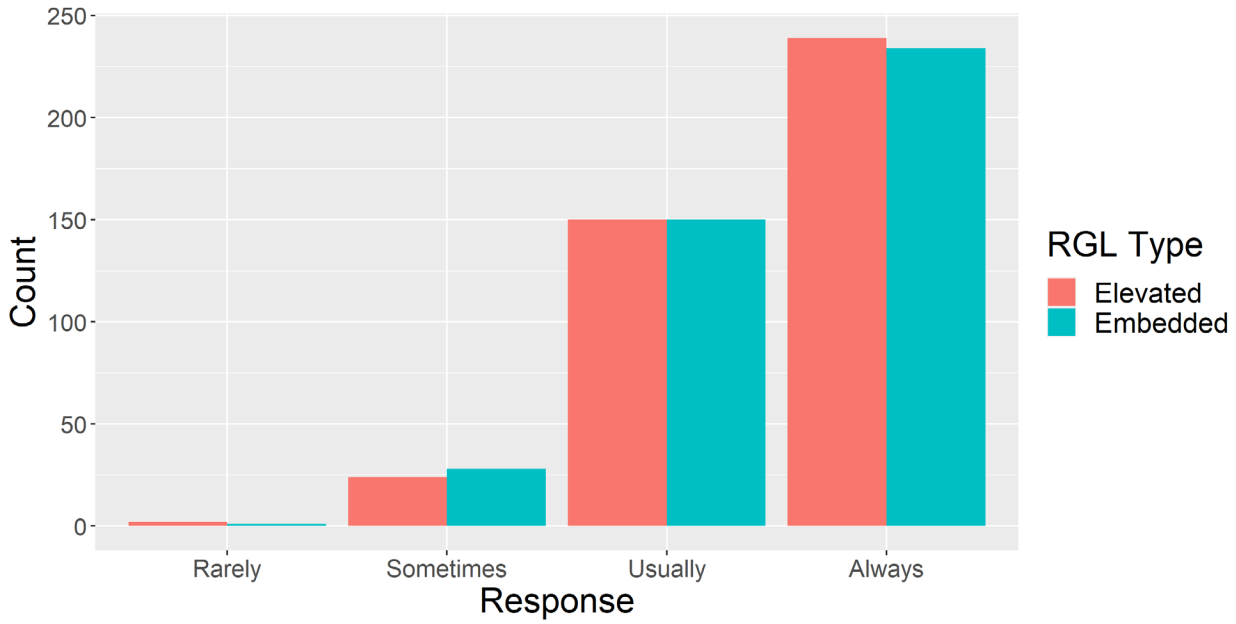

Figure 6. When approaching a hold short line, are runway guard lights visible from an adequate distance to be able to stop the vehicle/aircraft before crossing the hold-short line?

Participants were asked a series of questions regarding their past experience with the effectiveness of RGLs. Results are summarized in Table 8. This series of items presented different response options to participants depending on their earlier responses about their experience with elevated RGLs, embedded RGLs, or both types. Participants who had encountered only one type of RGL in the past were given the response options "Yes", "Unsure", or "No". Participants who had encountered both types of RGLs in the past were given the response options "Both embedded and elevated runway guard lights", "Yes, embedded runway guard lights", "Yes, elevated runway guard lights", "Unsure", or "No". Only a small proportion of respondents had only encountered one or the other type of RGLs, most had encountered both. Therefore, rather than analyzing the data separately for each group, for analysis purposes we combined the data from the three corresponding versions of each item.

Table 8. Summary of Survey Items on the Effectiveness of Runway Guard Lights

Has the presence of RGLs ever…	**No**	**Unsure**	**Yes, both**	**Yes, elevat**	**Yes, embed**
indicated the presence of a hold short line to you when head-down?	145	133	98	54	31
	31%	29%	21%	12%	7%
prevented you from crossing a hold-short line without clearance?	210	83	120	14	34
	46%	18%	26%	3%	7%
been obstructed or difficult to see?	284	45	40	40	52
	62%	10%	9%	9%	11%
prevented you from entering the intersection of an active runway?	212	79	116	22	32
	46%	17%	25%	5%	7%
prevented you from entering the intersection of a closed runway?	274	94	64	11	18
	59%	20%	14%	2%	4%

Participants were asked whether RGLs had ever indicated the present of a hold short line when they were heads down (Figure 7). Responses were divided between no (31%), unsure (29%), or yes (40%),.

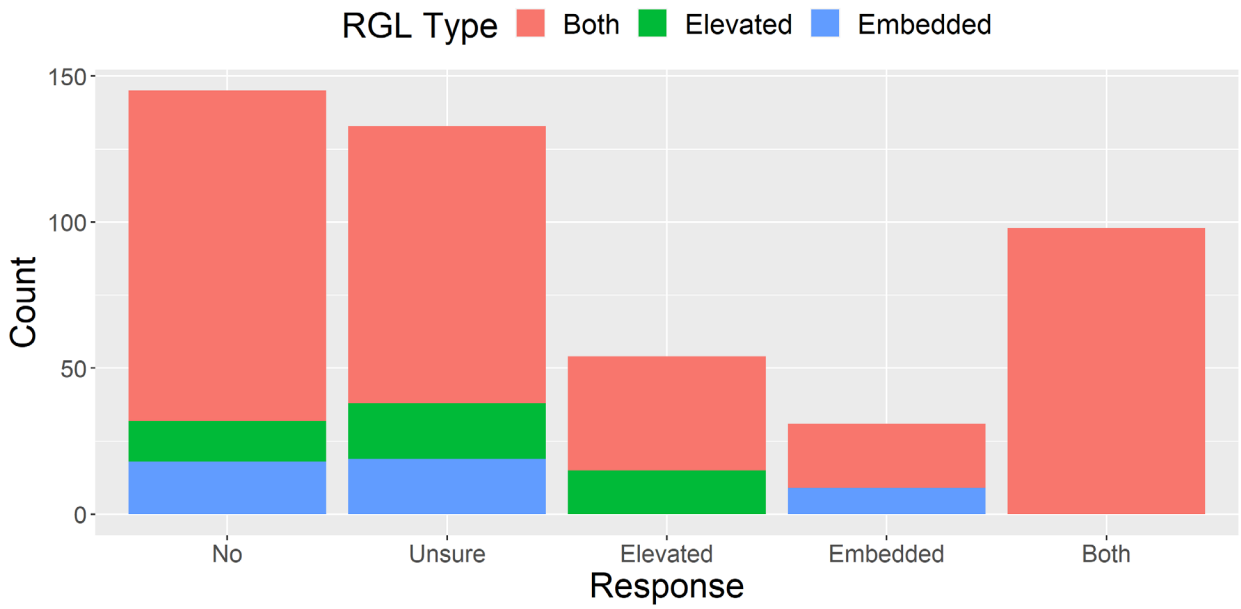

Figure 7. Have runway guard lights ever indicated the presence of a hold short line to you when head-down?

Participants were asked whether RGLs had ever prevented them from crossing a hold short line without clearance (Figure 8). Responses were divided between no (46%), unsure (18%), or yes (36%).

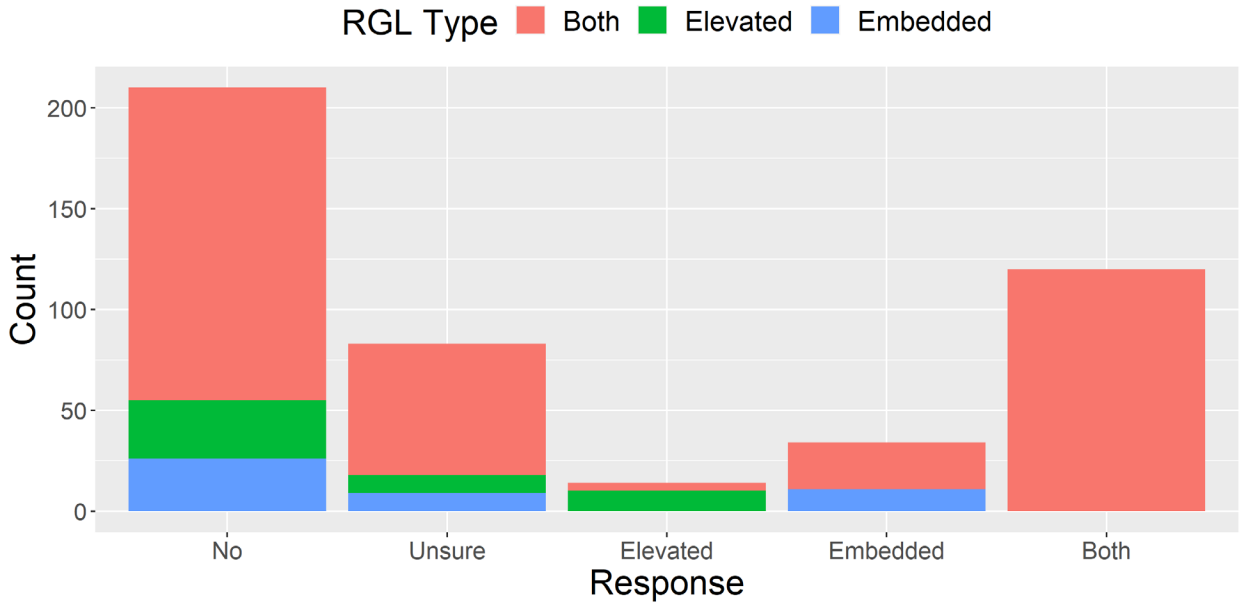

Figure 8. Has the presence of runway guard lights ever prevented you from crossing a hold-short line without clearance?

Participants were asked whether RGLs had ever been hard to see (Figure 9). Responses were divided between no (62%), unsure (10%), or yes (28%).

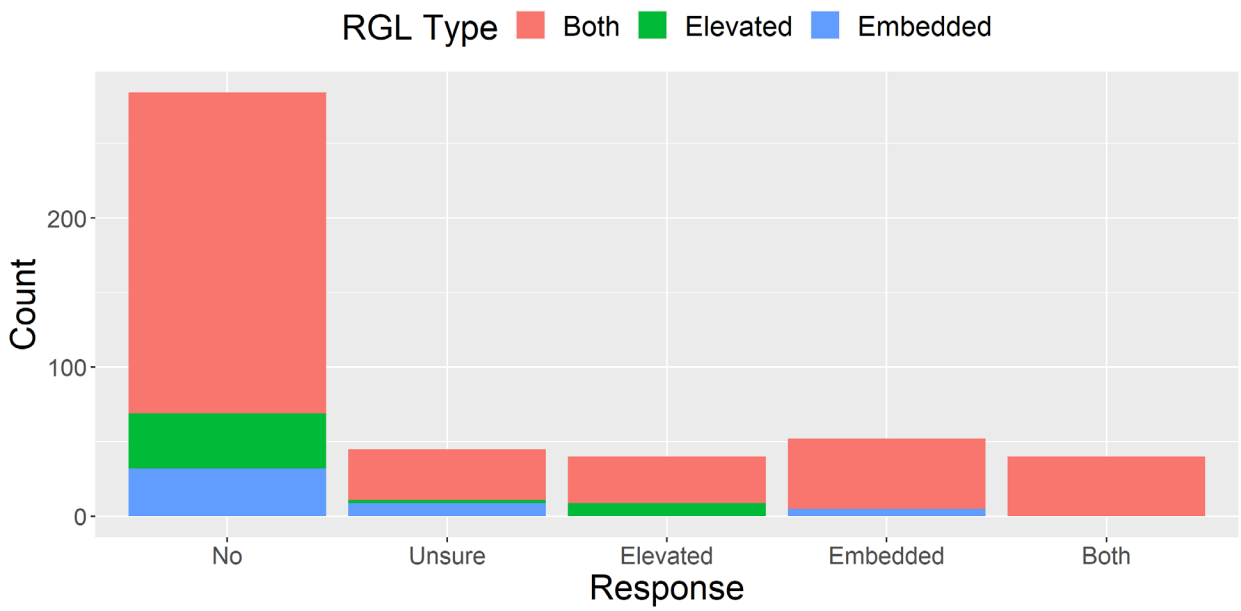

Figure 9. Have runway guard lights ever been obstructed or difficult to see?

Participants were asked whether RGLs had ever prevented them from entering an active runway (Figure 10). Responses were divided between no (46%), unsure (17%), or yes (37%).

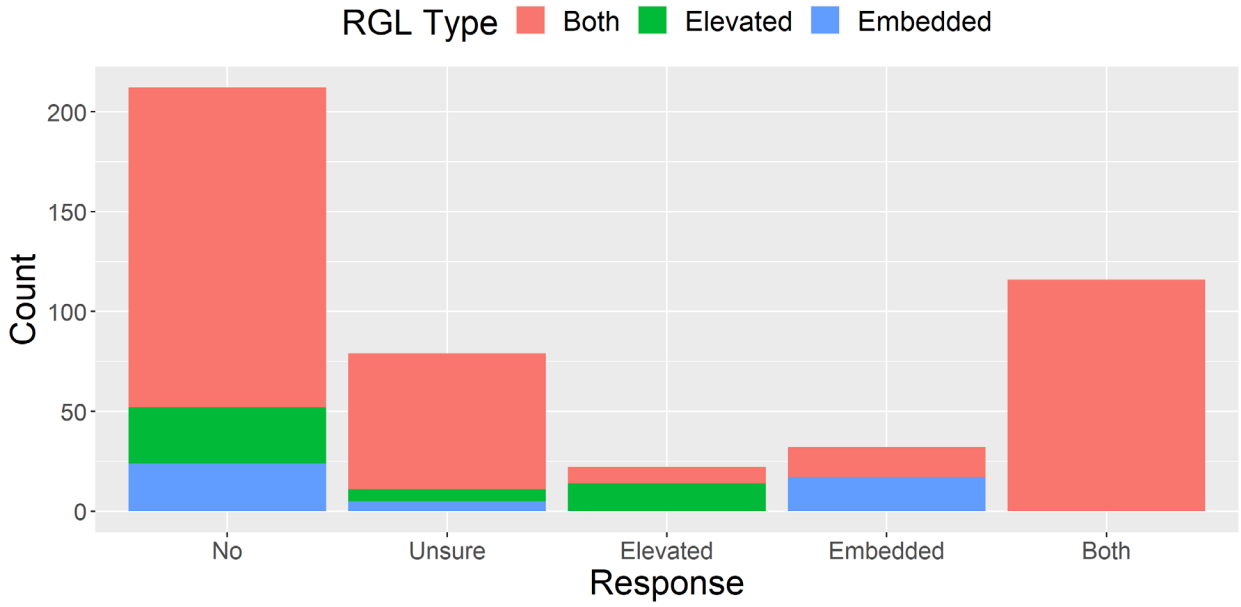

Figure 10. Has the presence of active runway guard lights ever prevented you from entering the intersection of an active runway?

Participants were asked whether RGLs had ever prevented them from entering a closed runway (Figure 11). Responses were divided between no (59%), unsure (20%), or yes (21%).

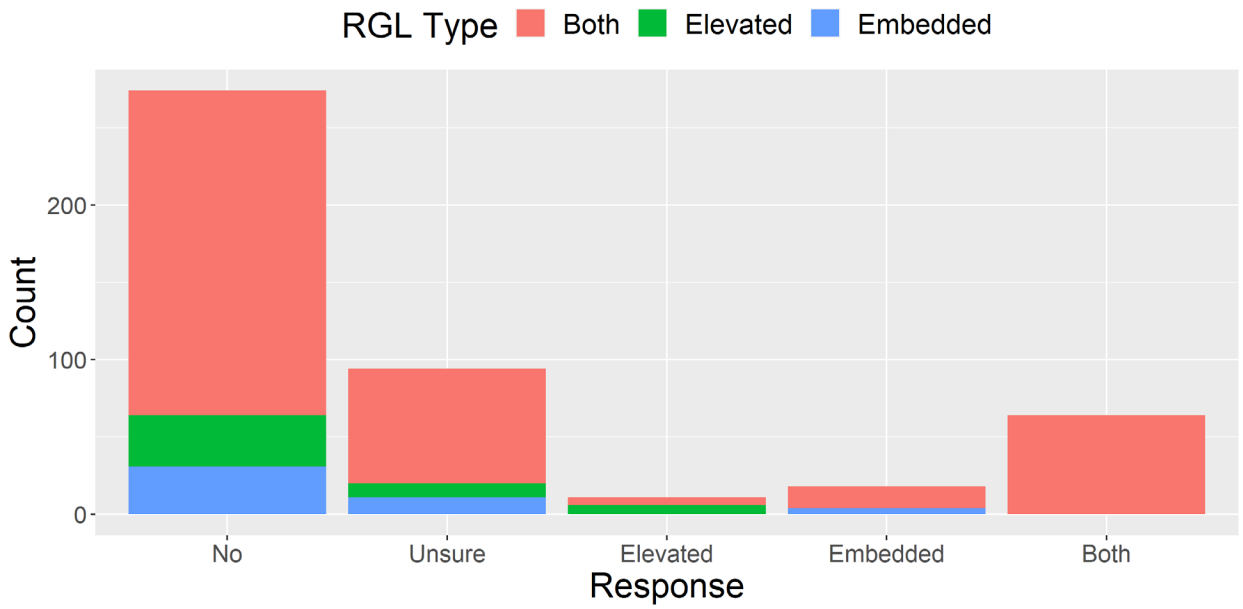

Figure 11. Has the presence of active runway guard lights ever prevented you from entering the intersection of a closed runway?

At the end of the survey, participants had the option to provide any additional comments regarding the effectiveness runway guard lights using a free text field. Reponses generally aligned well with the results described above: many participants emphasized that RGLs were a great tool to improve visibility, especially at night, and they should be installed at more airports. Some participants emphasized how elevated RGLs were superior to embedded RGLs, and some participants stated the exact opposite preference with equal enthusiasm.

The open response did also include a few suggestions not captured elsewhere. One participant recommended that more RGLs be updated with LEDs to avoid burnt out bulbs. Several participants suggested that lightning coloration or flashing lights be used in conjunction with RGLs to communicate additional information, for example yellow lighting for a warning and red lighting for a closed runway. Participants stated that RGLs should have their angle properly adjusted to be visible from the cockpit and from the hold location at intersections. Similarly, they stated that RGLs should have their brightness adjusted to be visible during the day, but not blinding at night. Finally, several participants emphasized that while RGLs were an effective tool for improving visibility, signage and markings are still important and should be properly maintained.

4. Conclusion

Runway incursions often occur when a pilot or vehicle driver crosses the hold-short line of a runway. The installation of RGLs at runway-taxiway intersections is intended to prevent runway incursions by making the hold short line more conspicuous. This survey was conducted in order to assess whether pilots and drivers perceived RGLs as improving the visibility of hold short lines. Furthermore, using self-reported

survey data, it investigated which type of RGLs were most effective, under what circumstances RGLs were most effective, and whether pilots and drivers had anecdotal experience with RGLs preventing runway incursions.

The majority of survey participants had knowledge of and firsthand experience with RGLs while operating in the airport movement area. They reported that these RGLs increased their awareness of hold short lines. They reported that RGLs were usually visible in time to stop at a hold short line. Participants reported that RGLs were most helpful during nighttime operations, low visibility operations, and at unfamiliar airports. Roughly half of participants reported personal experience with RGLs preventing them from crossing a hold short line and/or entering a runway.

Although the majority of participants had encountered both elevated and embedded RGLs, there was little difference their evaluations of the two types. On average, participants rated embedded RGLs as significantly more likely to increase awareness of hold short lines; however, both types of RGLs had positive evaluations. The different RGL types may each have their benefits in different operational environments. Participants considered embedded RGLs significantly more beneficial then elevated RGLs during night operations, while they considered elevated RGLs to be significantly more beneficial then embedded RGLs for day operations. Otherwise, participants made no significant distinction between the two types of RGLs. All else being equal, airports installing RGLs may want to consider embedded RGLs, as participants preferred these overall. However, the evaluations of each type of RLGs were so similar, that if other decision-making factors lean towards one type or the other, these factors could easily outweigh the minor preference for embedded RGLs among pilots and drivers.

A limitation of this study was the self-reported nature of the data. Respondents reported some preference for one type of RGL over the other and reported RGLs as being more or less effective in different environments or times of day. However, a perceived safety benefit does not necessarily correlate with an actual one. A review of the relevant literature would help to inform whether these self-reported preferences are empirically supported. Similarly, self-reports of past experience with RGLs helping to prevent runway incursions are limited by the memory of respondents. Experiences in which RGLs prevented a collision or high severity runway incursion might be highly memorable, but experiences where RGLs prevented a pilot or driver from entering an unoccupied runway might be harder to recall. Respondent may have even failed to perceive that RGLs helped to improve hold short line conspicuity at the time an incident occurred. Therefore, while these anecdotal accounts do provide evidence that RGLs are helping to prevent runway incursions, they do not provide useful data on how often this is occurring.

Overall, survey results indicate that many pilots and drivers think RGLs are effective at improving airport safety through preventing runway incursions. Many survey respondents advocated for expanded use of RGLs at airports, in conjunction with proper signage and markings. However, there was no consensus among survey participants regarding whether elevated or embedded RGLs were more effective. Survey data alone is insufficient to determine whether differences in preference reflect legitimate differences in the utility of each type of RGL under differing operating environments or come down to personal preferences. Future work could supplement these survey findings on RGLs with relevant perceptual research on lighting visibility under different viewing conditions or laboratory research to evaluate whether there is an empirical difference between the visibility of these two types of lighting.

5. Appendix A: Pilot/Vehicle Driver Survey

https://www.surveymonkey.com/r/Pilot-VehDriverRGLSurvey

Background
Runway incursion events continue to be a safety concern in the National Airspace System. The Federal Aviation Administration (FAA) is employing a data-driven approach to identify runway safety technologies that may solve runway incursion problems at specific areas of concern. One of the most common traffic scenarios occurring during a runway incursion is the unauthorized crossing of a hold-short line. As a result, the Volpe National Transportation Systems Center, in partnership with the FAA, is exploring the use of Runway Guard Lights as a runway incursion mitigation tool on the airport surface to prevent these unauthorized hold short line crossings.

The purpose of this survey is to collect information from pilots and airport vehicle drivers who encounter runway guard lights while operating in the movement area. The intent is to understand whether runway guard lights provide operators with an awareness of hold short lines in the movement area, how that awareness may affect runway incursions, in which operating conditions, and any differences between embedded and elevated guard lights. This data will be used to inform the decision-making process for future runway incursion mitigation tool investments and the expanded use of runway guard lights. Participation in this survey is voluntary. The information collected is anonymous. The Volpe Center will store and analyze the raw data collected from this survey and provide only the aggregate results and recommendations to the FAA.

The survey should take approximately 15 minutes or less to complete and has 8 to 20 questions, depending on provided responses.

Runway Guard Lights (RGLs)
Runway guard lights ("wig-wag lights") are designed to be visual aids for identifying the runway holding position (hold-short line) and provide pilots and airport vehicle drivers with an indication that they are approaching an active runway. It is recommended that RGLs not be operated when the associated runway is closed to landing and takeoff operations.

Runway guard lights are installed at taxiway-runway intersections. They are primarily used to enhance the conspicuity of taxiway-runway intersections during low visibility conditions, but may be used in all weather conditions. Runway guard lights consist of a row of in-pavement (embedded) yellow lights installed across the entire taxiway, at the runway holding position marking (see example A below).

Example A.

Elevated Runway Guard Lights (ERGLs)
Elevated runway guard lights (ERGLs) are collocated with the runway hold position signs and surface painted hold position markings. They consist of a pair of elevated flashing yellow lights installed on either side of the taxiway near the holding position sign (see Example B below)

Example B.

1. Do you operate aircraft or vehicles on the airport surface?

    Aircraft, Provide aircraft type(s) _____

    Vehicle, Provide vehicle type(s) _____

2. How frequently do you operate in the movement area?

    Daily

    Weekly

    Monthly

    Quarterly

    Yearly

3. How many years have you been operating in the movement area? _____

4. Did you have knowledge of runway guard lights prior to taking this survey?

Yes, embedded runway guard lights

Yes, elevated runway guard lights

Yes, both imbedded and elevated runway guard lights

No

5. Were runway guard lights/wig wags part of your vehicle driver training course? **(vehicle drivers only)**

Yes

No

Unsure

6. Please list the airports that you frequently operate at **(optional**): _____

7. Have you encountered runway guard lights (i.e., wig-wags) while operating in the movement area?

Yes

No

Unsure

7a. *If the answer to question 7 is 'Yes', they will be directed to answer the following question:* Which type(s) of runway guard lights (i.e., wig-wags)?

Embedded (installed *in pavement* near hold short line)

Elevated (installed *above ground* near hold short line)

Both

7b. *If the answer to question 7 is 'No' or 'Unsure', they will be directed to answer the following question and then the survey will end after question 18 appears.*

Do you think that installing runway guard lights would heighten your awareness of hold short lines for runway incursion prevention?

Yes

No

Unsure

8. How likely are e*mbedded* runway guard lights (i.e., wig-wags) to increase your awareness of the presence of a hold short line?

5 - Very likely

4 - Likely

3 - Neither likely nor unlikely

2 - Unlikely

1 - Very unlikely

Not applicable

9. How likely are *elevated* runway guard lights (i.e., wig-wags) to increase your awareness of the presence of a hold short line?

5 - Very likely

4 - Likely

3 - Neither likely nor unlikely

2 - Unlikely

1 - Very unlikely

Not applicable

10. When do you consider e*mbedded* runway guard lights to be most beneficial? Select all that apply.

Low visibility operations

Night operations

Day operations

High traffic period

Complex airport geometry

Unfamiliar airport

Other (please provide description) _____

Not applicable

11. When do you consider *elevated* runway guard lights to be most beneficial? Select all that apply.

Low visibility operations

Night operations

Day operations

High traffic period

Complex airport geometry

Unfamiliar airport

Other (please provide description) _____

Not applicable

12. Have runway guard lights ever indicated the presence of a hold short line to you when head-down?

Yes, embedded runway guard lights

Yes, elevated runway guard lights

Both embedded and elevated runway guard lights

No

Unsure

13. Has the presence of runway guard lights ever prevented you from crossing a hold-short line without clearance?

Yes, embedded runway guard lights (please provide description - optional) _____

Yes, elevated runway guard lights (please provide description - optional) _____

Both imbedded and elevated runway guard lights (please provide description - optional) ____

No

Unsure

Not applicable

14. When approaching a hold short line, are runway guard lights visible from an adequate distance to be able to stop the aircraft/vehicle **before** crossing the hold-short line?

Yes, I can ***always*** see runway guard lights from an adequate distance to stop the vehicle/aircraft ***before*** to crossing the hold-short line

Yes, I can ***usually*** see runway guard lights from an adequate distance to stop the vehicle/aircraft ***before*** to crossing the hold-short line

Only ***sometimes*** am I able to see runway guard lights from an adequate distance to stop the vehicle/aircraft ***before*** crossing the hold-short line

No, I can ***rarely*** see runway guard lights from an adequate distance to stop the vehicle/aircraft ***before*** crossing the hold-short line

No, I can ***never*** see runway guard lights from an adequate distance to stop the vehicle/aircraft ***before*** crossing the hold-short line

15. Have runway guard lights ever been obstructed or difficult to see?

Yes, embedded runway guard lights (please provide description - optional) _____

Yes, elevated runway guard lights (please provide description - optional) _____

Both imbedded and elevated runway guard lights (please provide description - optional) ____

No

Unsure

Not applicable

16. Has the presence of active runway guard lights ever prevented you from entering the intersection of an active runway?

Yes, embedded runway guard lights (please provide description - optional) _____

Yes, elevated runway guard lights (please provide description - optional) _____

Both imbedded and elevated runway guard lights (please provide description - optional) ____

No

Unsure

Not applicable

17. Has the presence of active runway guard lights ever prevented you from entering the intersection of a closed runway?

Yes, embedded runway guard lights (please provide description - optional) _____

Yes, elevated runway guard lights (please provide description - optional) _____

Both imbedded and elevated runway guard lights (please provide description - optional) ____

No

Unsure

Not applicable

18. Please provide any additional comments regarding the effectiveness of runway guard lights that you feel is important (optional).