

"Virtual" Yellow Trap

Question raised by Mark Luszcz, DE
Distributed 8/16/17

Issue/Question:

One of the advantages of Flashing Yellow Arrow left-turn operations is that there is not supposed to be a "yellow trap." At the NCUTCD meeting in Pittsburgh, there was discussion that some agencies are seeing crashes related to a "virtual yellow trap." If you aren't familiar with the yellow trap, the web site below is a good reference. See attached for some excerpts of crash reports – the police could not have done a better job spelling out exactly what happened in these cases – yellow trap!
<http://projects.kittelson.com/ppit/LearnAbout/Learn3.htm>

With that introduction, please answer the following questions:

1. Does your agency use FYA?
2. If so, have you observed the described virtual yellow trap issue?
3. Do other agencies in your state use FYA?
4. If so, are you aware of virtual yellow trap issues being experienced by those agencies?

Summary:

32 responses
Q1: Yes - 23 (72%); No - 8 (25%); Other - 1 (3%)
Q2: Yes - 7 (30%); No - 16 (70%)

Responses:

Highlighted responses received after 10/15/17

State	Response			
	Question 1	Question 2	Question 3	Question 4
AK	YES	NO. I've heard back from all three of our regions and none have experienced this. Regional comments below: Central Region says, "We do not have any lead/lag signal operations yet. We expect to implement some in the coming year." Northern Region says, "We lead with the protected green arrow, then go solid yellow, then red (through an all-red clearance). (i.e. what's shown on the bottom right animation). We don't currently have any lead-lag signals." "We lead with the protected green arrow, then go solid yellow, then red (through an all-red clearance). (i.e. what's shown on the bottom right animation). We don't currently have any lead lag signals."	YES. I only heard back from the City of Fairbanks, but I think the Municipality of Anchorage also operates some FYA signals.	NO. Again, only heard back from Fairbanks, but Anchorage lays wholly within our Central Region, and the Region said they've not experienced this.
AL	Yes, approximately 45-50 sites have been converted to FYA	No. So far we have not had any operational or safety concerns. Feedback from the public has been overwhelmingly positive. Perhaps the publicity we conduct prior to implementing in an area has helped???	Yes, a few are.	It's not as likely for us to hear concerns from our local government entities, but I expect if they were experiencing this type of concern they would have reached out to us and so far we have heard nothing from them.
AR	Yes, we adopted FYA after the 2009 release of MUTCD. We had two Cities who had sought interim approval prior to 2009 MUTCD.	No.	Some Cities have adopted at City intersections.	No
AZ	No in general except for one location.	the lagging left turn trap is not an issue at the interchanges. The ramps are one-way, so there is no opposing left turn movement that would result in the type of cycling that would create the trap condition.	Yes. Locals	No.

State	Response			
	Question 1	Question 2	Question 3	Question 4
CO	Yes, the City of Lakewood has 24 FYA intersections.	Yes, we have observed and have PD documentation of yellow trap crashes when using lead-lag operation at FYA's. No issues at lead-lead or equal-split lag-lag locations.	Yes	The only agency that I am aware of that had yellow trap FYA crashes was also using lead/lag, and that was the City of Boulder (NW Metro Denver). They had trap issues at one location and converted to PO from FYA.
DE	No, but we use Flashing Red Arrow, which could potentially have the same issue. However, we do not have any FRA with lead-lag phasing at this time.	No.	No.	n/a
FL	Yes, and we are currently developing guidelines for FYA implementation statewide.	No, however, we do encourage public outreach prior to implementing FYAs and we have updated Florida's Driver Handbook to include FYA.	Yes, some Cities and Counties.	No, we are not aware of local agencies experiencing the virtual yellow trap when using FYA.
GA	Yes	a. Yes, at limited locations. The only locations where this has been observed is where a 5-section doghouse signal head existed previously. We believe that this phenomena occurs primarily because Georgia used protected/permissive phasing with the 5-section head and a leading left turn extensively, and therefore drivers are trained that the left turn phase will terminate with the through movement. It is our expectation that this will overtime dissipate. As a counter measure, we have explored making the leading phase a protected only movement in some lead-lag scenarios.	Yes	Yes, but in limited numbers.
IA	The cities operate the traffic signals on the state system	NO	YES	NO
ID	Yes	I'm not aware of it being an issue	Yes	I've not heard about any "virtual yellow trap" issues from our local agencies that use FYA.
IL	Illinois began using FYA around 2010 in the Peoria area and a research project was conducted to study the safety benefits of the implementation. One of the reasons for utilizing FYA was to allow for lead/lag flexibility. At intersections where we utilized lagging protected lefts with FYA, we did see a few occurrences of the yellow trap. These occurrences appeared to be limited to locations where the opposing left turn lanes had a negative offset or were directly in line with each other. We believe that some motorists still tended to view the adjacent through-movement signal indications at these locations because of the close proximity of the left turn lane to the through lanes and because of potential reduced sight distance of opposing through traffic. Having a positive offset or buried left turn lanes opens up sight distance and puts left-turning motorists further away from the through-movement signal indications. For this reason, our FYA policy only recommends lead/lag operations where opposing left turn lanes have a positive offset.	Yes - at locations with negative offset (see more details in answer to question 1)		

Virtual Yellow Trap - Survey Results - Updated

State	Response			
	Question 1	Question 2	Question 3	Question 4
IN	INDOT started using FYA a couple of years ago and to my knowledge has not been experiencing yellow trap issues. I'm checking with our Signal Systems Office to get their input and will forward along to you.	No		
KS	Yes. We have begun using FYA in protected permitted situations.	No we have not.	Yes. Larger cities, mainly on the eastern half of the state have begun using the FYA and even replacing all protected permitted signal phases to FYA; however, a large majority of cities that own traffic signals, due to cost, have not moved to replacing existing protected permitted signal phases to FYA. As new projects involving signals move forward, more FYA should be installed throughout the state.	No city has contacted KDOT regarding a virtual yellow trap issue with a FYA.
KY	Yes. We started using FYA in 2009.	No	Yes	No reported problems from those agencies.
MA	MassDOT has standardized the use of FYA for Protected-Permissive Left Turns on approaches with left turn only lanes. MassDOT also recommends FYA for Permissive-Only on approaches with left turn only lanes.	MassDOT has not utilized FYA as a countermeasure for potential yellow-trap left turns since lagging protected lefts were not an accepted design practice prior to FYA. In discussions for potential future applications of lagging protected lefts, MassDOT would only consider it if a supplemental far-side left FYA signal face and supplemental FYA signage were also installed.	Some municipalities in Massachusetts have adopted FYA on locally-owned roads.	4. MassDOT is unaware of any "virtual yellow trap" problems on local roads.
MD	No		No	
ME	Yes	No, but I am having our crash records section to review individual crashes	No	N/A
MI	Yes	a. The "virtual yellow trap" has been observed Association of the "virtual yellow trap" to specific crashes is difficult because crash reports do not often contain descriptions of the signal indications. b.	Yes	a. Some agencies perceive an issue with the virtual yellow trap. Additional comments attached
MN	No		No	
MO	Yes	No, Missouri uses a signal head per lane. We do not allow shared signal heads. FYA LT phase is separated by itself and not "tied" to the adjacent through movements. Instead it is logically "tied" to the opposing through movements as mentioned in the Flashing Yellow Arrow scenario of the Kittelson information to prevent the yellow trap.	Yes	No
NC	YES maybe 10 years +/-	NO	YES	None have been reported, and no responses when asked.
NH	Yes.	No.	One or two municipalities and we are trying to promote increased use in the remaining municipalities with traffic signals.	No.
NJ	No			
NM	No, but we are planning to come up with a policy to allow the use of FYA.	Some local entities use it but we have not heard of any yellow trap.	yes	No
NY	NYSDOT began using it several years ago. We have about 40 locations converted with many more to go.	Haven't noticed the yellow trap issue	Not aware of any municipalities using FYA in New York besides NYSDOT.	N/A
OH	No			

Virtual Yellow Trap - Survey Results - Updated

State	Response			
	Question 1	Question 2	Question 3	Question 4
OR	Yes	Yes, in a few locations.	Yes	Yes, in a limited number of locations.
SD	Yes.	No, we have never seen that described in a crash report or heard of any issues with this.	Yes.	I asked the traffic engineer for the city of Sioux Falls and he said that ironically enough with the 30 intersections they have in town with FYA, it was just one week ago that the only crash happened that he is aware of in regard to what would possibly be a virtual trap. The driver made a statement to the officer that he was aware it was a flashing yellow arrow and that he had pushed trying to make the turn in front of opposing traffic.
UT	YES.	YES.	YES.	NO.
VA	Yes	No, we are not aware of the "virtual" yellow trap at Virginia signals. We have guidance addressing yellow traps with FYA. See Section A3 of VDOT technical memorandum TED 381. http://www.virginiadot.org/business/resources/IIM/TE-381_Flashing_Yellow_Arrow.pdf		
WV	No	N/A	No (very few City owned/operated signals in WV	N/A
WY	Yes. All left turn phases were converted two years ago.	I have seen this issue.	Yes. Only the City of Cheyenne.	I have not heard this complaint from them. However, I have seen this issue at their signals.