TecNote 1200 – Independent Pedestrian Overlap Programming Considerations

The purpose of this TechNote is to assist the user in programming Independent Pedestrian Overlaps using V76.x or V80.x software on a Naztec ATC or a 2070 Controller. This is a specialized overlap that the user must program based on the considerations that are outlined in this document.

Independent Pedestrian Overlap Overview

The purpose of the Independent Pedestrian overlap is to provide flashing don't walk clearance across multiple parent phases. For agencies with pedestrians that span over multiple phases and lanes this overlap needs to typically provide a minimum amount of walk indication (between 5-7 seconds) and don't walk time equal to the minimums set forth by the MUTCD. Since these don't walk times can be very long when crossing major arterials, this pedestrian overlap was built to bridge the long don't walk times across multiple parent phases. This document will outline the operational characteristics of typical overlaps used by other agencies and match them with the programming of Trafficware's Independent Pedestrian (Overlap Type = INDPED) overlap.

INDPED General Requirements

The Independent Pedestrian overlap (herein referenced as INDPED) does not follow parent phase peds. The parent phases are defined in order to determine that phases that are concurrent with the INDPED overlap. The parent phases are defined in order for the INDPED overlap to determine if there is enough time to operate the INDPED overlap indications.

The INDPED overlap has the concept of a "overlap call". This call comes from a pedestrian push button, and is a latching call, just as a normal pedestrian call is. The INDPED overlap also has the concept of a recall, which causes an overlap call to be placed on the overlap when it is not timing pedestrian walk or clearance.

When there is a call, the overlap will use the parent phases to determine if there is enough time to service the INDPED indications. This is done as follows:

Free Operation:
a) Is there an overlap call? (must be true to start service)
b) Is a parent phase green? (must be true to start service)
c) Starting with the parent phase that is green, and moving forward through the ring, even looping back to the start of the ring, make a list of phases that are all "in a row" (no non-parent phases, but zeroes are okay). Using the list, does the sum of the max times (or remaining max times) for the list of "in a row" parent phases add up to greater than the total amount of time needed to service the INDPED indications? (must be true to start service)

Coordinated Operation:
a) Is there an overlap call? (must be true to start service)
b) Is a parent phase green? (must be true to start service)
c) Starting with the parent phase that is green, and moving forward through the ring, even looping back to the start of the ring, make a list of phases that are all "in a row" (no non-parent phases, but zeroes are okay). Using the list, find the last phase in the list. Look at the force-off of the last phase in the list. Using the force-off, compare the time of the force-off to the current local cycle counter. Looking at the difference between the current cycle counter and the force-off, is that amount of time greater than the total amount of time needed to service the INDPED indications? (must be true to start)

Rest In Walk (only in coordination)
a) All of the requirements of "coordinated operation"
b) Using the force-off of the last phase "in a row", back up in time the amount of the INDPED clearance time, and note that point in the cycle as the "pedestrian leave time". The walk indication will stay active past the INDPED walk time up until the "pedestrian leave time" in the cycle. At that point it will start the INDPED clearance interval.

Parents must exist in the same ring
a) The parent phases must be in the same ring. This is needed to determine if the sum of splits/maxes have enough time, it must also insure that they have the ability to "run in a row". This can only be done if they are in the same ring. However, the parent phases can exist in the same barrier or different barriers in the same ring.
b) The parent phases listed in the INDPED overlap, as well as the parent phases as listed in the ring sequence do not need to be sequential. However, the INDPED algorithm needs to determine if there is enough time to start pedestrian service. Therefore, it has to assume that the phases will operate "in a row", as to prevent a phase from holding in green to finish the INDPED overlap service. So, they must be sequential in operation, but not as listed. For example, using standard 8 phasing with leading lefts, you can have 1+2+4 as the parent phases. The algorithm can start the INDPED indications in 4, and continue through 1 and 2; or, if the time of way were to swap 3 and 4, then it can start with 1 and continue through with 2 and 3.

Conflicting Phases

a) An INDPED overlap will honor conflicting phase programming that prevent the overlap from starting if a conflicting phase is on. If a conflicting phase is active, the overlap will not begin operation. Likewise, if the overlap is active, then the conflicting phase will be held from beginning.

b) An INDPED overlap will honor conflicting phase programming that terminate the overlap if a conflicting phase is next. If a conflicting phase is next, the current phase will be held in green until the overlap completes timing, or the conflicting phase will be held from beginning until the overlap completes timing.

c) Operational summary: If a conflicting phase is present, the INDPED overlap cannot begin operation. Vice versa, if the overlap is active, then the phase cannot begin. If a conflicting overlap is present, the INDPED overlap cannot begin operation. Vice versa, if the overlap is active, then the overlap cannot begin. If a conflicting pedestrian is present, the INDPED overlap cannot begin operation. Vice versa, if the overlap is active, then the pedestrian cannot begin.

If no parent phase is on, the overlap is not on or the overlap is terminating

a) The overlap begins operation based upon algorithm above, and will hold the parent phase in green, or prevent a next phase from becoming green to prevent conflicts. It is not accurate to say it is "not on or terminating", but instead that it "continues operation to completion/termination"

b) If no parent is next, the overlap will hold at the barrier until complete

Detection: Applying Calls

a) The overlap call is driven by ped button, and set up in the ped button "+" settings (MM-5-9-4).

b) When the overlap call is received, all parent phases will receive a min recall

c) When a parent phase is active and there is an overlap call, the overlap will make the "can I start walk?" decision, as discussed above. (this decision step creates a "in a row list" of phases)

d) Once the overlap goes active, the calls are removed from the parent phases, and then MAX calls are placed on the "in a row" phases.

e) Overlap ped detectors shall have program settings to allow for fault detection and alarming

f) The normal ped detector alarm/monitoring mechanisms will be used to create alarms.

g) Pedestrian detectors can call overlaps – all parents receive a call when overlap ped is called

h) This results in the concept of an "overlap call". The parent phases do not receive a call, but instead the overlap itself receives a "call". If a call is present, then it will determine when to start operation, and based upon controller mode/state it will also apply calls as needed to the parent phases.

Other Considerations

   a) Overlaps whose parents are flagged as start-up phases shall serve at start-up until the INDPED operation begins. See section above
   b) Overlaps shall have settings in the preempt configuration to allow the overlap to service during preempt
   c) The INDPED overlap will honor the allowable overlap settings in preemption. If the overlap is not allowed, and the preempt begins, the overlap will terminate normally, or based upon the preemption settings.

Additional Notes:

1.   The user is responsible for assuring there is not a timing issue with coordination. There is no coordination diagnostic at this time.
2.   The INDPED overlap can begin timing in any included phase (see discussion above)
3.   The order in which the parent phases are listed in the INDPED overlap settings does not carry any additional information. The order has no meaning.
4.   During coordination, the INDPED overlap will use "stop in walk" if programmed in the coord parameters. This means that if any phase is required to stay green potentially past its force-off, the local cycle counter will "stop" until the INDPED overlap has timed its termination. This will cause transition in coordination instead of skipping of phases.
5.   The INDPED overlap logic is responsible for applying calls to the parent phases (see discussion above)
6.   The INDPED overlap gets a start-up call if any of the parent phases has a start-up call.
7.   The INDPED overlap now has concept of "call"
8.   The INDPED overlap will not have any operation dependent upon a phase's pedestrian movement. It is not overlap phase peds, it is truly an independent overlap.
9.   The INDPED overlap will have "rest in walk" functionality. This functionality will use the walk interval as a minimum, and transition from walk to clear based upon time left in the cycle until the force-off of the last phase "in a row"
10.   The INDPED overlap will have recycle/recall functionality, which will be applied when the overlap is not in walk/clear.

11. Under coordination, when using typical Four phase diamond programming (as shown on the diagram below), the user should set Stop-in-Walk (MM-2-1) to OFF when the INDPED overlaps the frontage road (for phases 4+3 and 8+7). This will insure that the pattern kicks free if there is not enough split time to run the INDPED walk and pedestrian clearance in coordination. In addition the programming will also need to set for phases 3 and 7 the Max1 time to equal the MinGrn time of those phases to insure the arterial does not start up and stops at the downstream signals
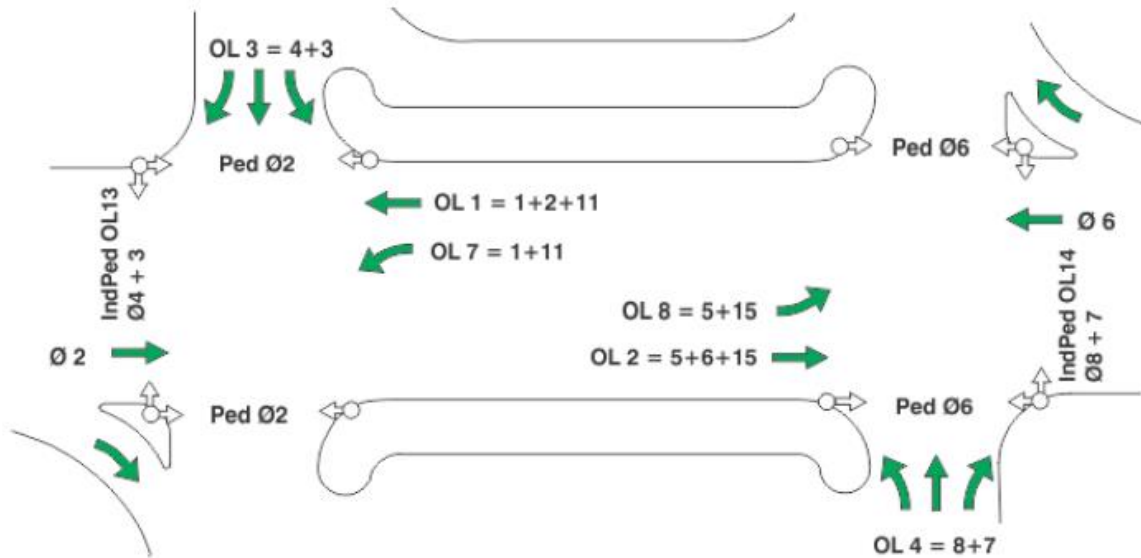
Example Programming

Below are the screens to program the INDPED Overlap. This Tech note will use a V80.x controller software. This example will use STD 8 phasing. It will program Overlap 3 as the INDPED Overlap will be a phase 2+3 IND Ped and it will use Ped Detector # 3 for the INDPed detector call. We will run 10 seconds of walk time and 15 seconds of Pedestrian clearance time.

Go to MM->1->8->1 and program Channels 1 -16 as shown below:

```
    Chan..1...2...3...4...5...6...7...8>        <    Chan.9...10..11..12..13..14..15..16
P/Olp#    1    2    3    4    5    6    7    8    P/Olp#    1    2    3    4    2    4    6    8
  Type     VEH  VEH  VEH  VEH  VEH  VEH  VEH  VEH     Type     OLP  OLP  OLP  OLP  PED  PED  PED  PED
Flash Red X    X    X    X    X    X    X    X    Flash Red X    X    .    X    .    .    .    .
Flash Yel .    .    .    .    .    .    .    .    Flash Yel .    .    .    .    .    .    .    .
Flash Grn .    .    .    .    .    .    .    .    Flash Grn .    .    .    .    .    .    .    .
Alt Hz    .    .    .    .    .    .    .    .    Alt Hz    .    .    .    .    .    .    .    .
Dim Grn+  .    .    .    .    .    .    .    .    Dim Grn+  .    .    .    .    .    .    .    .
```

Go to MM->5->4 and make sure Ped detector #3 is not programmed.

```
Det#   Call   NoAct   MaxPres   ErrCnt
  1      0       0        0         0
  2      2       0        0         0
  3      0       0        0         0
  4      4       0        0         0
  5      0                0         0
  6      6       0        0         0
  7  +   0       0        0         0
```

Go to MM->5->9->4 and Program Ped Enh+ screen and Program Ped detector 3 to be driven by Overlap 3

```
Ped#   Olp
  1      0
  2      0
  3      3
  4      0
  5      0
  6      0
  7  +   0
```

Go to MM->1->5->1 and program the General Overlap parameters

```
        General Overlap Parameters
            Lock Inhibit OFF
        Confl Lock Enable OFF
          Parent P Clrncs ON
      InhibitLockInterval ALWAYS
```

Go to MM->1->5->2->1 and program Overlap 3 as an Independent Ped overlap for parent phases 2 and 3. The walk time is programmed using the overlap Green time.

```
Olp  3 .............Phases.............
Inc   2  3  0  0  0  0  0  0  0  0  0  0
      0  0  0  0  0  0  0  0  0  0  0  0
      0  0  0  0  0  0  0  0
Mod   0  0  0  0  0  0  0  0  0  0  0  0
      0  0  0  0  0  0  0  0  0  0  0  0
      0  0  0  0  0  0  0  0
Type:IndPed   Grn: 10   Yel: 3.5   Red: 1.5
```

Next go to MM->1->5->2->3 and program the Ped Clearance time as shown below.

```
   Ovrlp   3
Leading Green   OFF   FYA MCE Disable OFF
Transit Input     0   FYA Skip Red    OFF
FYA Delay Time    0   FYA AfterPrempt OFF
PedCallClear    OFF   FYA Ext Overlap   0
PedClearTime     15   FYA ImmedReturn OFF
GoBarNoNext     OFF    GreenSwap       OFF
OverrideExcl    OFF+  OverrideGreen    OFF
```

Summary

The INDPED Overlap provides a specialized flashing don't walk clearance across multiple parent phases based on independent pedestrian calls and operational