

**Отдел за безопасност на движението**

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**3M™ AVERAGE SPEED CAMERA SYSTEM ENFORCEMENT MANAGER USER ИЗДАНИЕ НА РЪКОВОДСТВОТО 2.1**

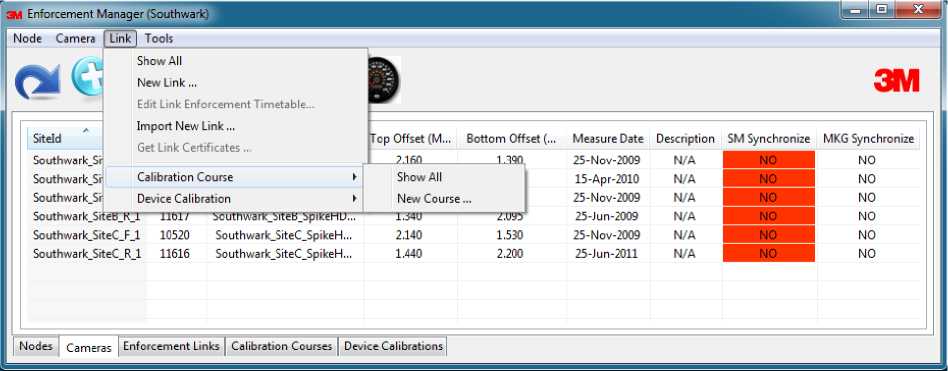
***3M™ Average Speed Camera System Enforcement Manager User Manual Issue 2.1* СПИСЪК С ИЗВЪРШЕНИТЕ ПОПРАВКИ**

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| ИЗДАНИЕ | ДАТА | КРАТКИ ДАННИ ЗА ИЗВЪРШЕНАТА ПРОМЯНА |
| 1.0 | 17/07/2009 | Първоначална версия |
| 1.1 | 26/052010 | Актуализиране на снимките |
| 2.0 | 08/07/2013 | Актуализиране на 3М номенклатурата за продукти |
| 2.1 | 19/02/2014 | Малки промени на някои думи след извършен вътрешен преглед на текста |
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Настоящият документ представлява последното издание, показано в таблицата по-горе. Автори: Куифенг Хуанг

**1 Въведение**

3M™ Система за управление изпълнението на камера със средна скорост (EM, позната преди като Система за управление изпълнението SpeedSpike) представлява самостоятелна програма, която може да бъде инсталирана, заедно с OVDS или на друга машина. EM предоставя GUI (графичен потребителски интерфейс) за всички аспекти на мрежовата топология на изпълнението, прага на скоростта, разписанието на изпълнението и сертификата за калибриране на всеки линк. В ЕМ могат да бъдат зададени и управлявани камери, възли (групи от камери, които работят като една точка за изпълнение), линкове (директни пътища между отделни възли), както и курс и данни за калибриране, свързани с измерванията на разстоянието между линковете. Табовете, разположени в долната част на екрана, дават подробности за всеки вид информация, предоставен от системата. Менютата в горната част на екрана предоставят специални графични интерфейси за създаване, редактиране и други операции, свързани с Възли, Камери, Линкове (със съответното калибриране). За основните операции системата предоставя бързи бутони – за създаване, редактиране и изтриване на елементи на текущия екран. За удобство са включени и бутони за записване на CD за SM (съдържащ топология на изпълнението, праг на скоростта и разписанието на изпълнението за всеки линк) и за КМ (съдържащ камери в мрежата), както и за конфигуриране на общия праг на скоростта за мрежата. Обобщаващият екран на ЕМ е показан на фиг. 1.

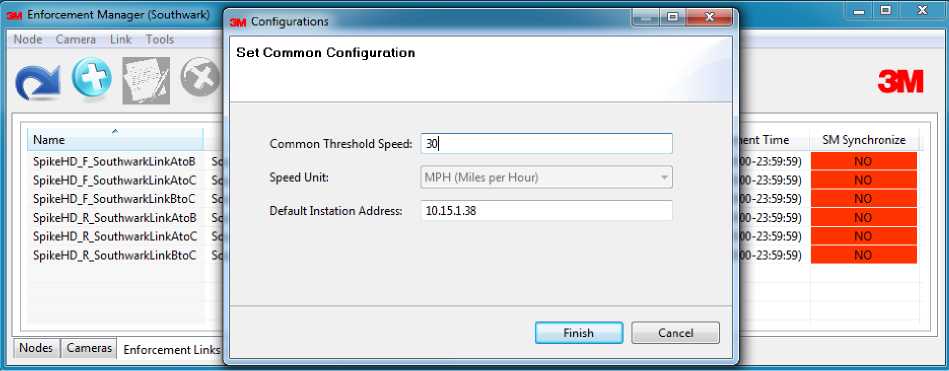


**Фиг. 1 Обобщение на EM**

The system will exit if it failed to verify any signed data retained. This only happens when the EM is run with a key store with a wrong serial number or some critical data has been tampered with. Follow the popup messages to login or load a key store during first run.

The common enforcement threshold speed and speed unit (metric or imperial) must be set before the first camera or link is entered into the system. This operation as shown in figure 2 can be done by clicking corresponding button or menu item, or it will automatically pop up while trying to creat the first camera or enforcement link. The speed unit can’t be changed once the enforcement data is delivered to SM for the first time. However, the threshold speed can be changed any time, but please note a new CD should be generated and loaded into SM/ERCU DB to make it come into enforcement.

Паролата за базата с ключове на ЕМ трябва да бъде подадена при стартиране на ЕМ, но база с ключове може да бъде заредена и от CD от КМ, при което да се потвърди паролата, ако към момента няма налична база с ключове, което е обичайно при стартиране на системата. При стартиране се проверява валидността както на базата с ключове, така и на всички данни, получени от ЕМ. Ако базата с ключове е изтекла или все още не е валидна, можете да разглеждате само съществуваща информация или да смените текущата база с ключове на ЕМ с нова, но не можете да създавате или редактирате елементи. Ако системата не успее да валидира дори един пакет данни, тя излиза

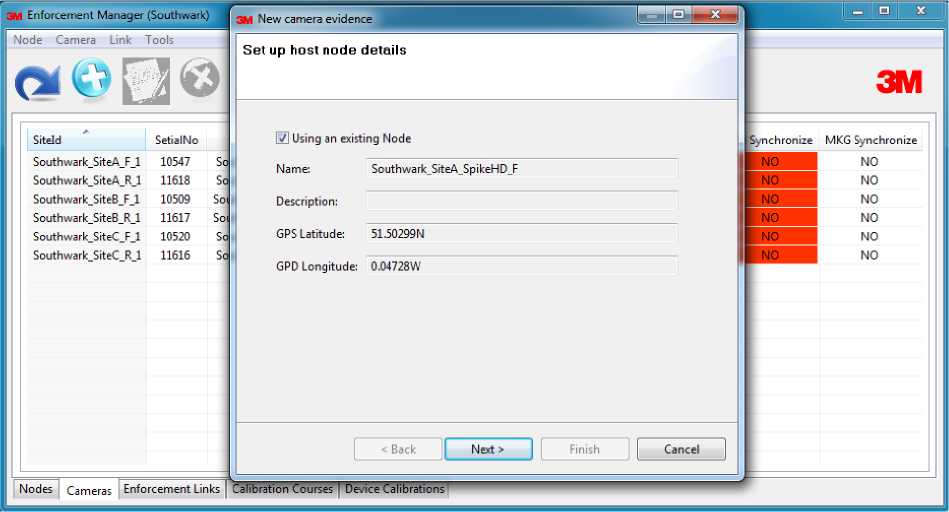


**Figure 2 EM common configurations**

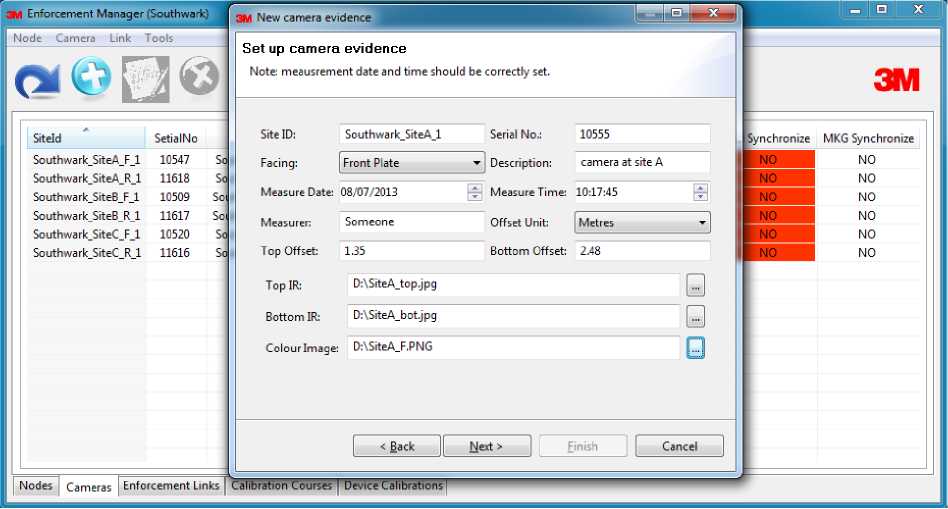
**2 Camera**

The camera operations available are create, delete, edit baseline and edit camera configuration.

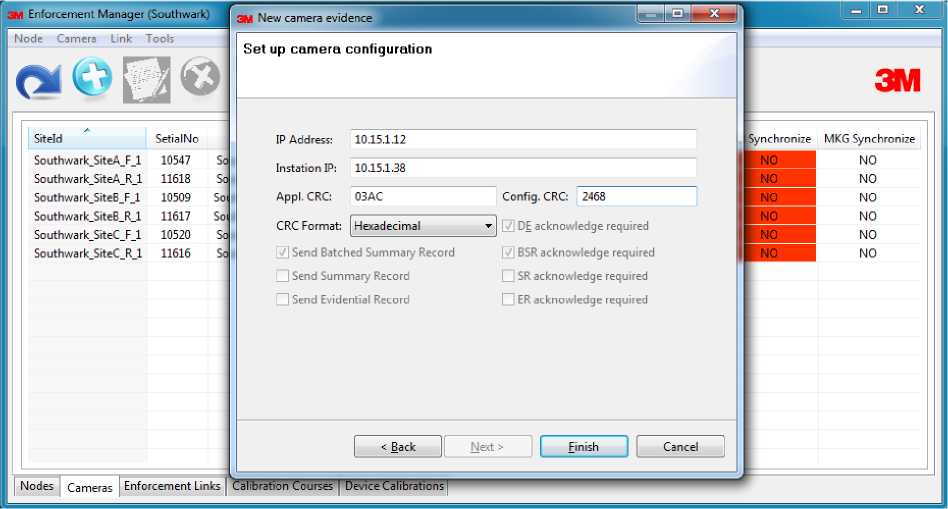
The three steps of creating a new camera are shown in figure 3 to 5. Firstly the node where the camera is deployed is set. Either details of a new node can be manually input, or an existing node selected from a popup list. Then details of the camera and its calibration details need to be entered, and finally some of the camera’s configuration can be set. It is not possible to progress to the next step or finish the operation if any compulsory information is missing or in unexpected format: a warning message will be shown in the status area.



**Figure 3 Node setup page for creating new camera**



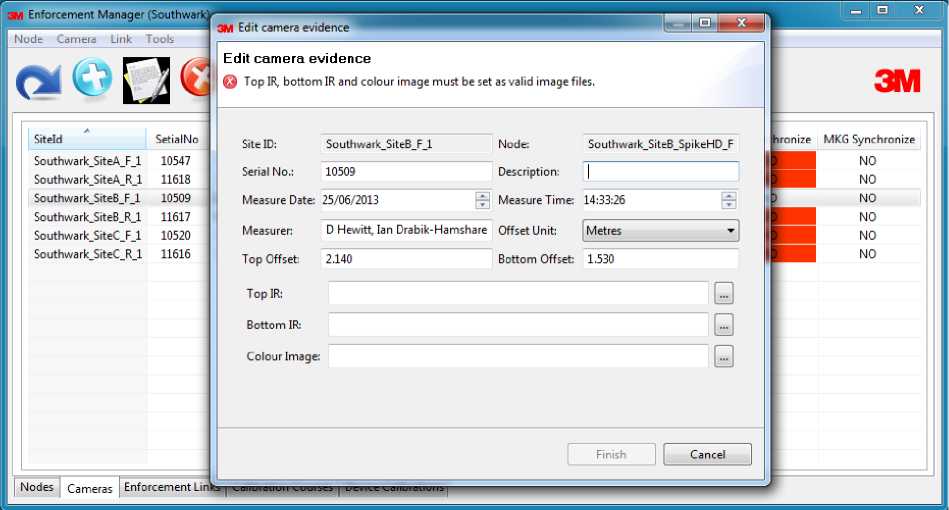
**Figure 4 Camera details and baseline setup page**



**Figure 5 Camera configurations setup**

Depending on whether the details of a camera have ever been delivered to SM, deleting a camera in EM has one of two outcomes: permanently deleting this camera from the system if not delivered to SM; or disabling this camera from further enforcement if they have.

For certain reasons such as camera adjustment, the baseline information of the camera may need to be changed. This process is shown in figure 6. Please note only base line measurement done after the current valid one is allowed to come into the system, and the EM doesn’t actually delete any enforced historic base line record unless a camera is eligible to be permanently deleted. Full historic base line details will be referred to and can be viewed in related link certificates.



**Figure 6 Edit camera baseline information**

Similarly EM also provided function to change camera’s configurations, such as the configuration CRC of the camera. The difference is that EM doesn’t keep any historic configurations for the cameras.

**3 Node**

The operations available to a node are creating and deleting. The process of creating a node is similar to the page in figure 3, but you can only manually input details of the node to be created. Usually a node can’t be deleted, unless any camera deployed on this node and any link starting and destinating with this node have never been delivered to SM. Moreover, when a node is deleted, all cameras deployed on it and all link associated with it will also be deleted permanently from the system. So you should be really carefully about the delete operation.

**4 Link**

As the menu items shown in figure 1, available enforcement link operations are create, delete, edit, import a new link from spreadsheet, and get link certificates.

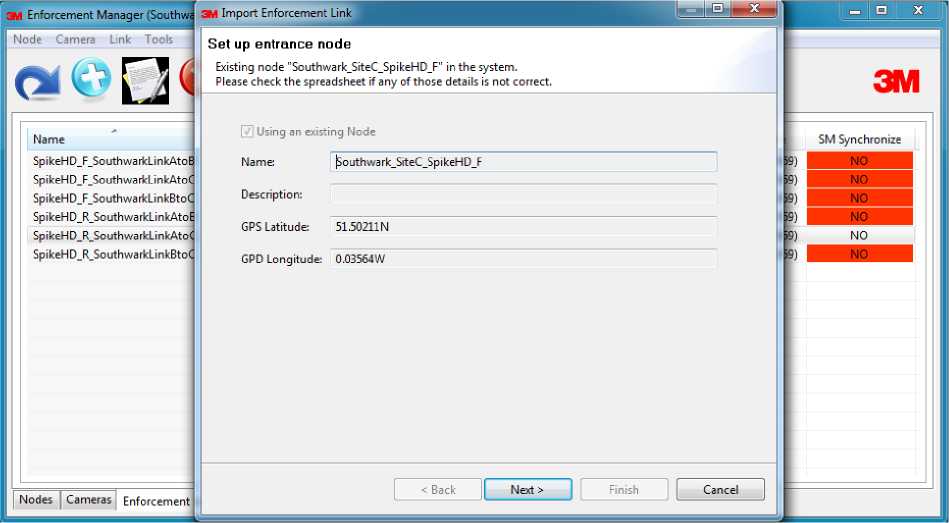
There are actually two ways to create a new link in EM. Manually inputting all information or importing all required information from a spreadsheet usually finished by measuring the link distance on roadside. EM will check all necessary information in the spreadsheet against the specification and existing data retained, and a well-formatted valid and complete spreadsheet can be imported into the system. Manually inputting details and importing details from spreadsheet follow similar process to create a new link as shown in figures 7 to 16, except that it is not possible to change any topology and measurement information during the import process.

First, the source and destination nodes of the link must be specified as shown in figures 7 and 8. Either an existing node must be selected from a popup list or a new node defined for either of them. Then the details of the link measurements must be specified as well as any calibration details if needed. Finally the enforcement timetable can be set up. As shown in figure 16, up to 4 enforcement periods can be set per day. However, this step can be ignored and set up later.

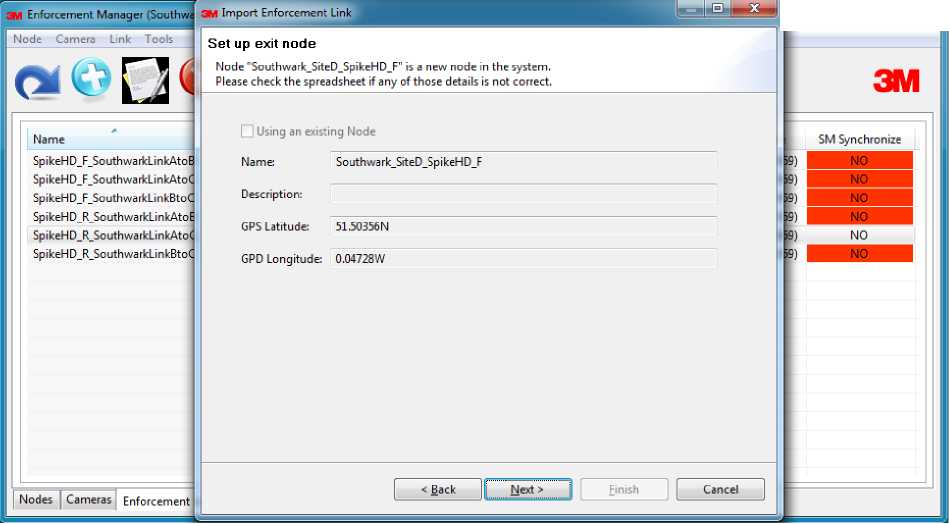
Some short links can be measured by a calibrated, temperature compensated steel measurement tape. Link distances are usually measured by a Corrsys-Datron L350 compliant to corresponding national calibration standards and HOSDB specifications. However, the Corrsys-Datron L350 must be calibrated over a calibration course measured by a calibrated, temperature compensated steel tape. Under certain conditions, a calibration course and device calibration can be reused.

On the second stage of creating a link, firstly the link measurement method must be selected as the page shown in figure 9. If a link is measured by tape, the process will beas shown in figure 10. In this case, information about the tape used must be provided, the temperatures when the measurements were done and at least three measurement results. If the results are acceptable based on HOSDB requirements, then the link distance will be automatically calculated after being compensated for temperature.

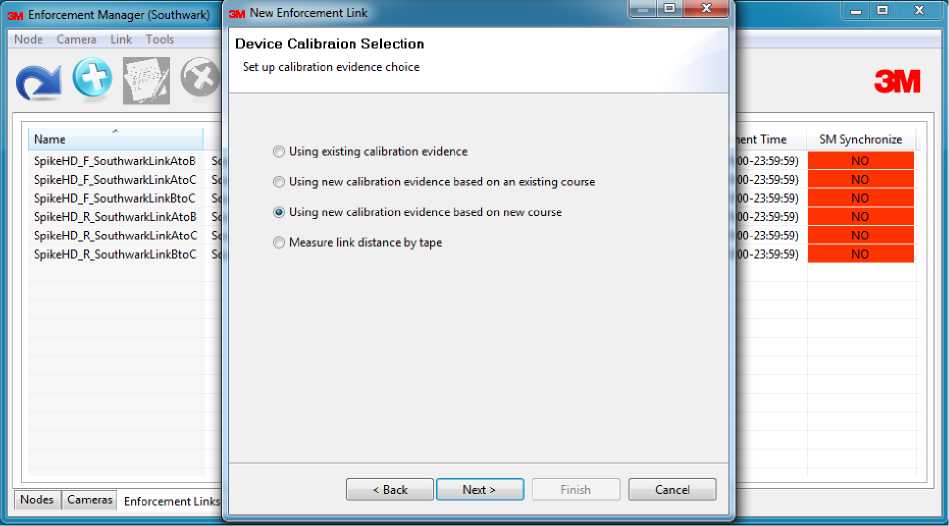
If you measured the link distance by a Corrsys-Datron L350, details of the calibration course and the calibration itself must be provided, or an existing oneselected. Pages in figures 11 and 12 show how a calibration course is set, and how a calibration is defined as shown in figures 13 and 14.



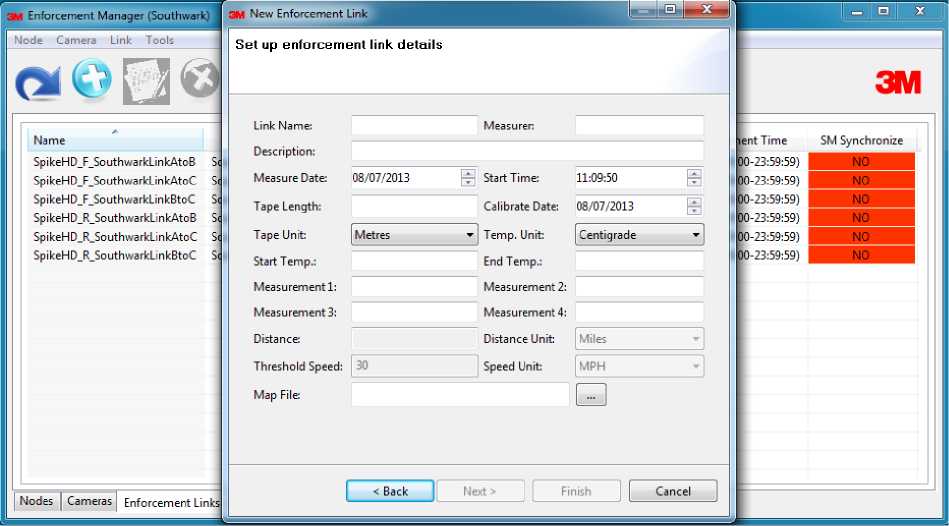
**Figure 7 Link source node setup**



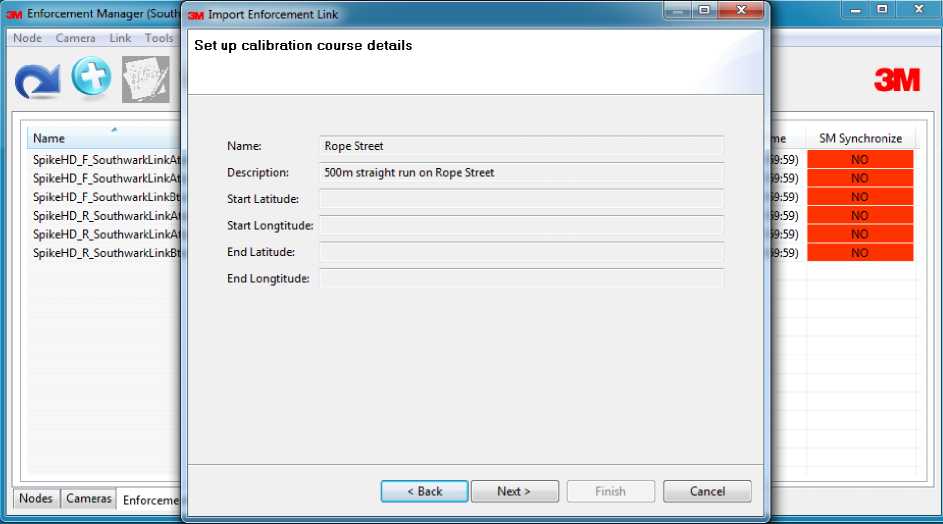
**Figure 8 Link destination node setup**



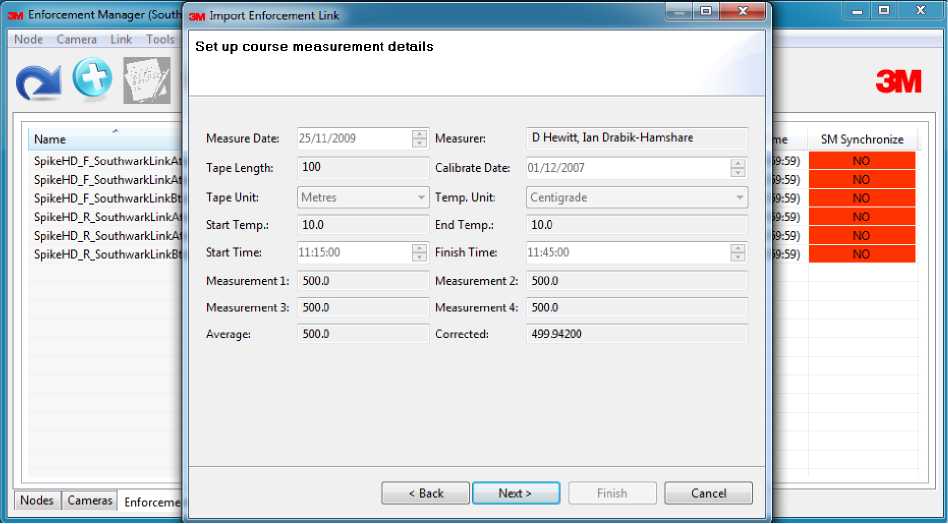
**Figure 9 Choose calibration and measurement method**



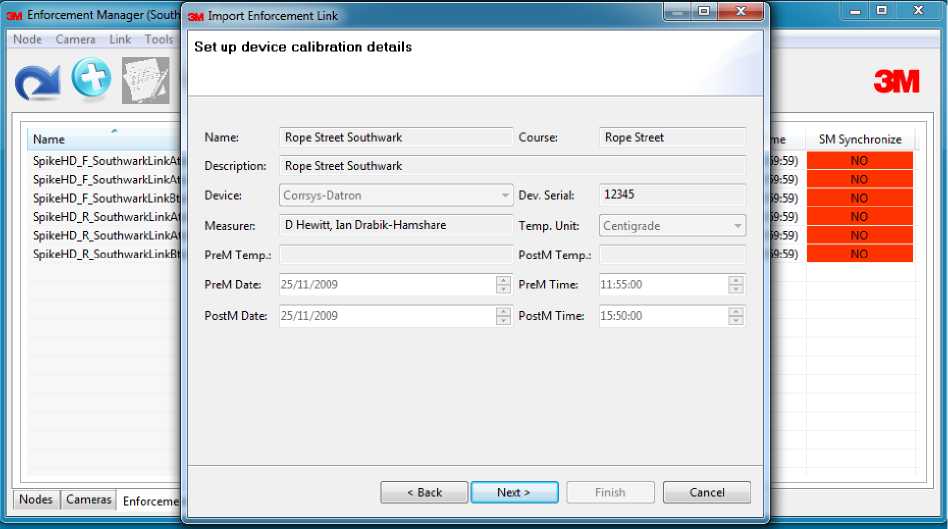
**Figure 10 link details and measurement done by tape**



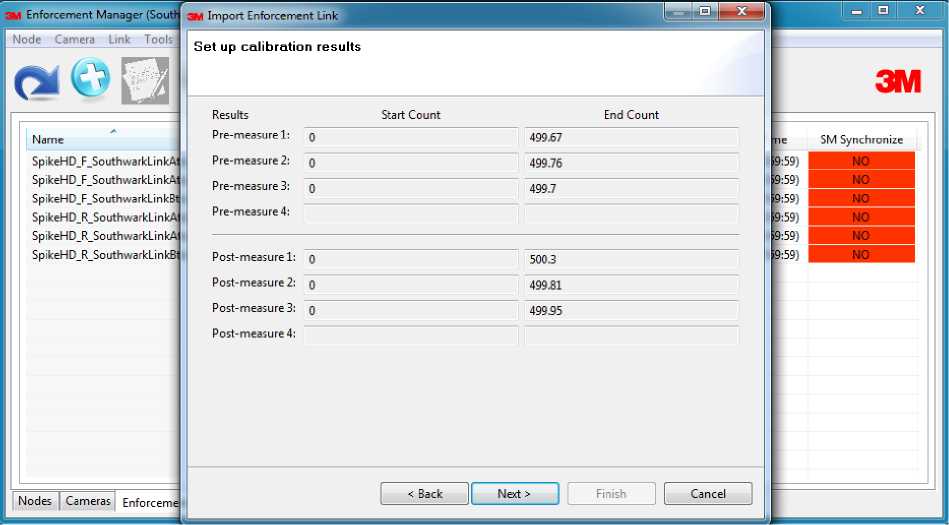
**Figure11. Calibration course setup page 1**



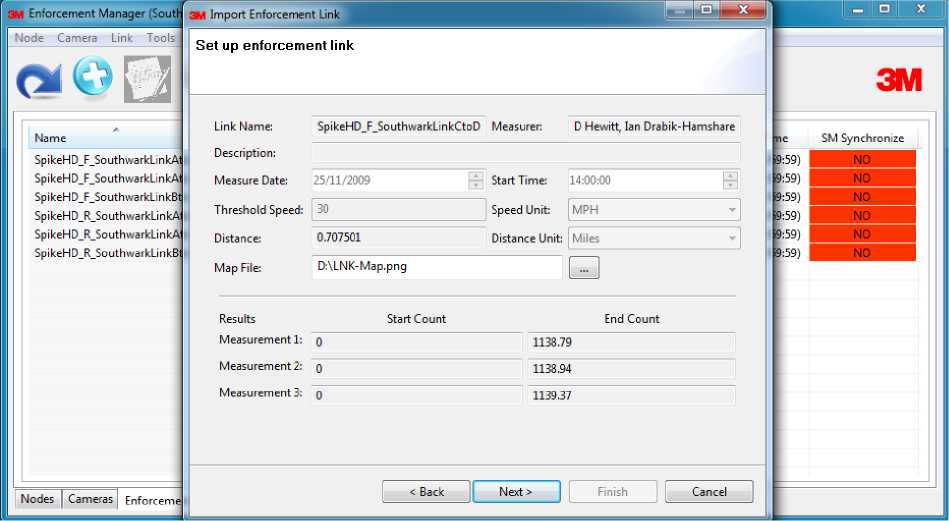
**Figure 12 Calibration course setup page 2**



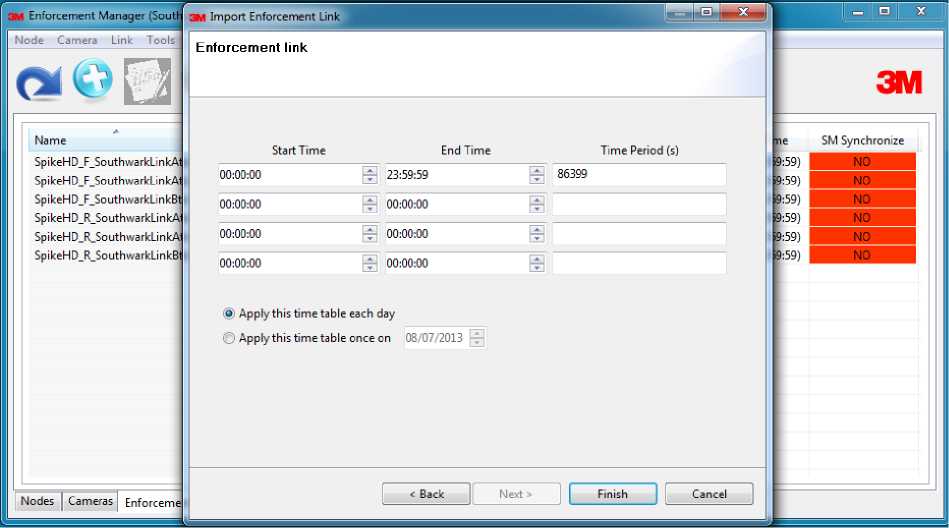
**Figure 13 Calibration setup page 1**



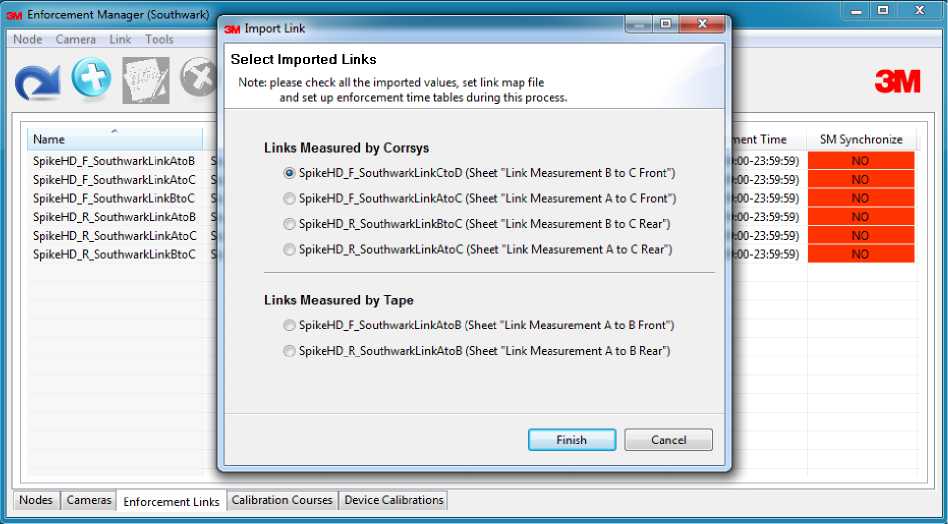
**Figure 14 Calibration page setup page 2 (measurement results)**



**Figure15 Link details and distance measurement**



**Figure 16 Link enforcement timetable setup**

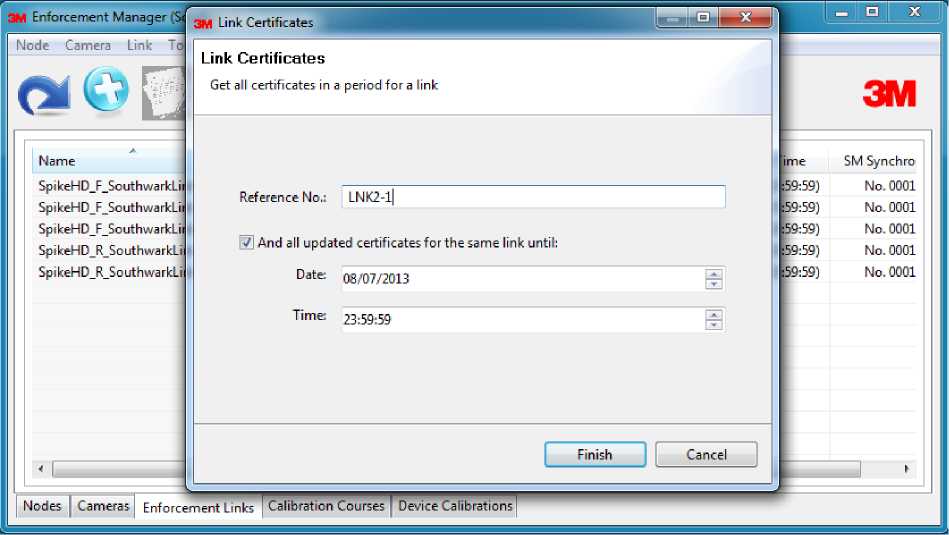


**Figure 17 Choose a link measurement to import**

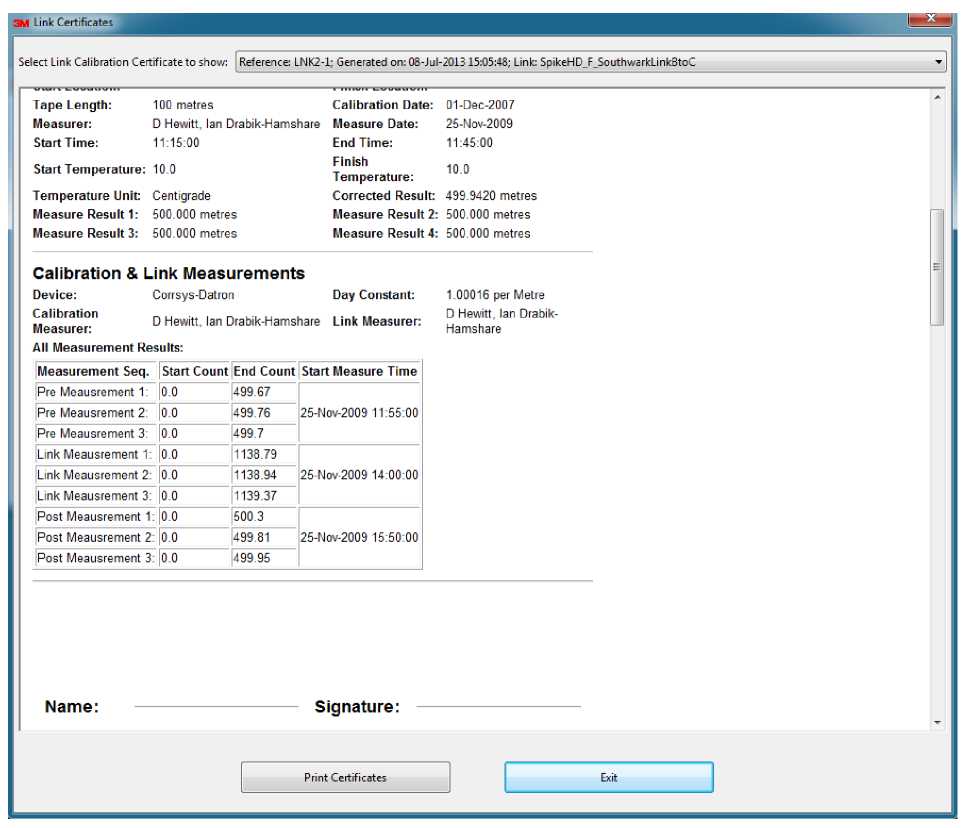
EM can only import new link measurements from a validated spreadsheet and will not allow the operator to change any details about the link and link measurement during the import process, to make sure that the spreadsheet always keeps the latest information. In the first stage of this import process, the system will automatically to validate the details in the spreadsheet and show warnings if it contains any unacceptable information. If something goes wrong, the spreadsheet must be corrected first before attempting to import the updated spreadsheet again. Once the spreadsheet is validated, the import operation will automatically determine which method has been used for each link measurement based on either a new or an existing calibration for a link between new or existing nodes. If more than one link measurement is defined in the spreadsheet, it will show a list of all detected ones and the one to be imported must be chosen, as shown in figure 17. Once a link measurement is selected to be imported, it will then go through the same necessary GUI pages shown in figure 7 to 16 as per creating a new link manually. However, except the last page of setting the enforcement timetable, this is for proof only and it is not possible to edit any data on any GUI page.

A link entered into the system can never be deleted unless it has never been delivered to SM for enforcement. Also the link measurement and its associated calibration details can’t be changed once it enters into the system. Editing a link actually only means changing the enforcement timetable as shown in figure 16.

A Link Calibration certificate is generated either after a new link is generated or a camera calibration associated with this link has changed, at the time when a CD is issued from EM to SM. The Link Calibration certificate must be physically signed and dated. EM provides the facility to query a link certificate or a series of certificates for a link in a particular period, potentially useful if a violation is challenged. The page for querying link certificate page is shown in figure 18 and the query result will be presented in a popup window as shown in figure 19. Select the certificate to view from the top drop-down list, and print all the certificates on a selected printer (from the popup printer/page dialog) if desired.



**Figure 18 Query link certificate**

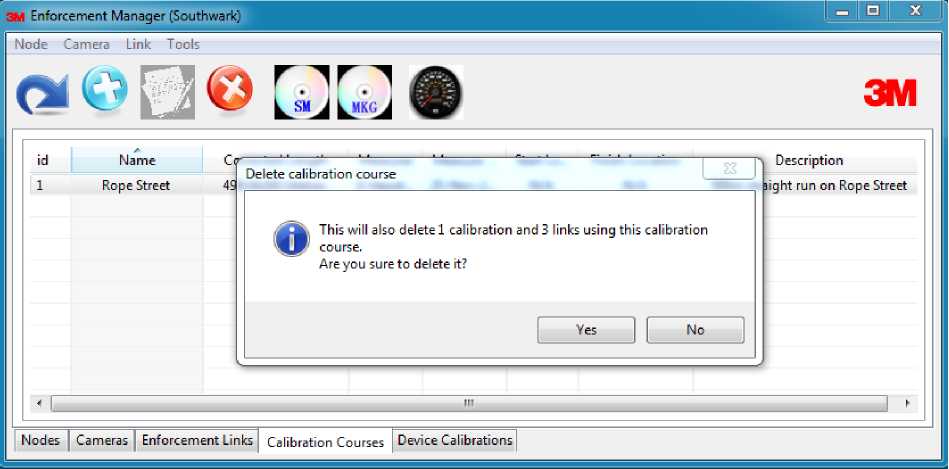


**Figure 19 Link certificate query result**

**5 Calibration and Calibration Course**

Creat and delete operations are available to both device calibration and calibration course. Creating a new one is similar to creating a new link as shown in figures 11 to 14 for device calibration and figures 11 to 12 for calibration course. It is possible to create a device calibration based on an existing calibration course.

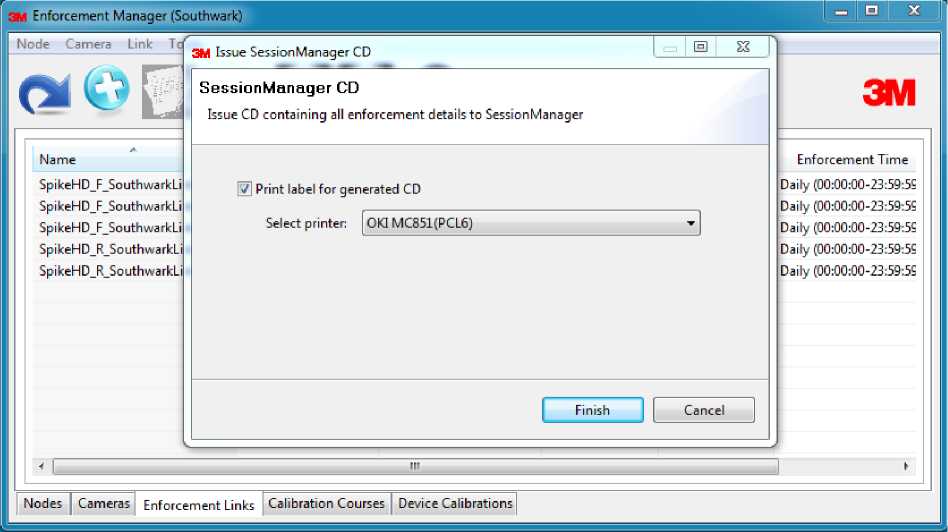
Deleting a calibration or a calibration is quite unusual and is not recommended. A calibration is eligible to be deleted only if all link measurements based on this calibrated device have never been delivered to SM for enforcement, and deleting a calibration will also delete all link based on this calibration. Similarly, a calibration is eligible to be deleted only if all calibrations done on this course are also eligible to be deleted. Deleting a calibration will also delete all calibrations based on this course and all link using these involved calibrations. Care must be exercised when deleting, although EM will issue a warning message about how many calibrations and links will be affected by this operation as shown in figure 20.



**Figure 20 deleting a calibration course warning**

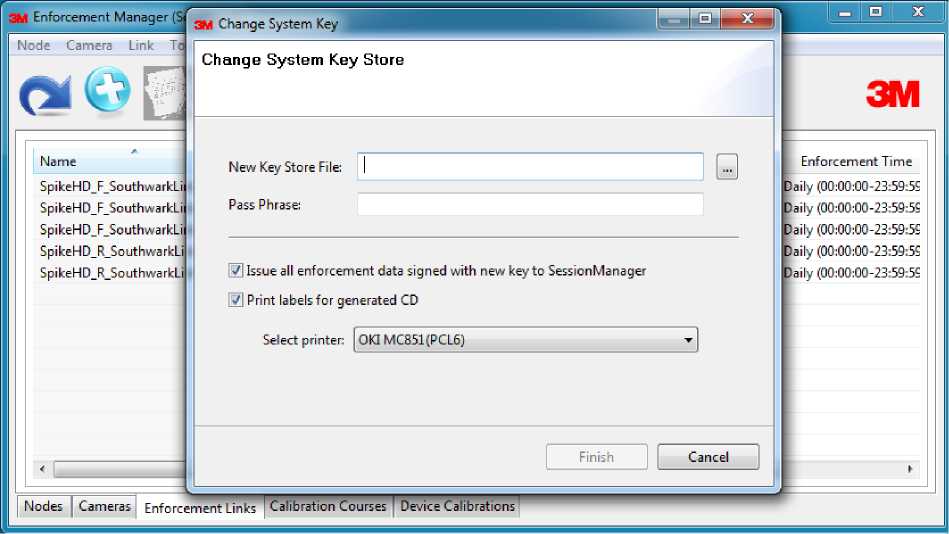
**6 Others**

Other functions supported by EM include issuing CDs to SM and KM and changing EM key store. All enforcement data and its update must first be entered into the 3M™ Average Speed Camera system from the EM and ithen transferred and loaded into SM by CD. The GUI page for issuing a CD to SM is shown in figure 21, it is only possible to set whether a CD label is needed to be printed on an available printer. EM will automatically wrap all latest link details, link enforcement timetables, topology nodes, configurations and baselines of all cameras, maximum threshold speed and all necessary signatures for SM/ERCU authentication purpose. Each record will be signed and encrypted as a whole, and then burned into a CD. If new link certificates are generated (on the condition mentioned before) in this process, it will pop up a link certificates browser as shown in figure 19. These new certificates must be printed, and then signed and dated as required (by a qualified person). CD for KM can be issued through a similar page as figure 21. This CD contains necessary information for the generation of shared secrets for all cameras in the enforcement network and can be imported into KM.



**Figure 21 Issue enforcement data to SM**

The final main function in EM is to update key store, which can be found under the "Tools” menu as shown in figure 21. This process will automatically update the signature for all protected critical data retained in EM DB with the new key. Meanwhile, for security reasons, signatures of critical enforcement data including topology, enforcement time timetable and threshold speed are set on EM. After SM has changed its key store, the old signature will fail during verification which will prevent SM/ERCU from further enforcement. As an option shown in figure 22, a CD with new signature can be automatically issued to SM to update the signatures usable with new SM key store while the same version of EM key store is loaded, although you can also issue a SM CD any time after the changing of EM key store process is finished.



**Figure 22 Change key store on EM**

**Appendix A: Main configuration in EM**

The name of CD-Writer should be configured in file $EM/conf/enforcement.properties, which is shown as follows:

cd.writer.device = d: