

FREE TV AUSTRALIA OPERATIONAL PRACTICE OP – 35

TV COVERAGE PLAN FOR INTERNATIONAL FIRST CLASS AND ONE DAY CRICKET

Issue 3
June 2007
Page 1 of 17

1. SCOPE

Free TV Australia Operational Practice 35 is a guideline for the minimum requirements for television coverage International First Class and One Day Cricket. It provides an indication of infrastructure for an outside broadcast production using contemporary production techniques which meet broadcast television presentation requirements. The description of facilities applies to those for one Outside Broadcast vehicle.

This Operational Practice has been developed by the Free TV Australia Project Group - Outside Broadcasts in the interests of maximising TV and Radio production potential and productivity at sports venues and avoidance of costly omissions at planning and construction stages.

TVOB coverage of cricket has progressed and expanded with the general availability of “super slo-mo” cameras, digital cable-less (wireless) cameras, “strike-zone” cameras, “run out” cameras and the “Hawk-eye” computer plot camera system. These developments have increased the venue space and infrastructure installation requirements for TV operations.

2. TYPICAL COVERAGE

2.1 Cameras

The configuration of a typical International standard match at an approved venue will be:

Cameras covering the field of play	12
Cameras for O/B studio	1
Presentation area camera	1 (RF portable)
Stump cam	2
Strike Zone	2
Run Out	4
Hawk-eye	6

2.2 Camera positions

2.2.1 Camera Platform North / South

Main camera placement for cricket coverage is to be on the centre line of the wicket in play. Typically on a camera platform located in the middle tier of the grandstand at a height in the order of 15 metres above pitch level and 80 to 100 metres from the centre of the pitch. Actual height and distance is determined by the geography and architecture of individual grounds.

The most important considerations are for a clear line of sight from the camera lens over the sight board to bowlers run up to achieve full coverage of fast bowler run-up and clear line of sight to mid pitch over the bowler's end umpire. Up to five cameras (including strike-zone) can be located at this level at both North and South ends.

Positioning of the camera platform should provide unobstructed follow of the ball in play from wicket to boundary (no obstruction from pillars, posts, PA speakers etc). A typical working platform is in the order of 8 metres wide exclusive of any non broadcast or venue cameras, and 2.5 metres deep. The platform needs to be centred on the wicket in play. The position of the main camera platforms needs to allow for on centre line coverage of all pitches in the wicket block, either by matching the width of the block, or by re-locatable camera platforms.

In the case of grounds with multiple wicket strips the camera platform needs to be locatable to the assigned wicket. This can be achieved by building demountable platforms over grandstand seating, provided that consideration be given to spectator line of sight behind the camera deck and to possible obstruction to cameras from spectator movements in front of the camera deck.

2.2.2 Slips Camera Position, North / South

A 1.8m x 1.8m area at ground level is required for placement of “SLIPS” cameras. The nominated positions are immediately behind the playing field perimeter fence or perimeter rope, 25 metres anti-clockwise from the centre line of the wicket in play, both at North and south ends of the field.

2.2.3 Reverse Slips Position North, South

A 1.8m x 1.8m area at ground level is required for placement of “REVERSE SLIPS” cameras. The nominated positions are immediately behind the playing field perimeter fence or perimeter rope at the clockwise limit of travel of the sight boards at both north and south ends of the field.

2.2.4 Mid Wicket Position

A 1.8m x 1.8m working platform is required that is aligned with the mid point of the wicket block on the western side of the arena. The position is generally subject to grandstand architecture, but preferred siting is typically at a height of 6m, approximately 20m back from the playing field perimeter fence.

2.2.5 Roof Camera

A roof camera platform is proposed wherever grandstand structures can permit placement of a suitable platform. The platform should be 1.8m x 1.8m north or south of the field and should comply with current State and Federal work safety requirements.

Access ways to the roof camera should provide for transporting of equipment to the platform, including “hard” cameras (typical 30 kg) and tele zooms (typical 40kg) Lifting aids are to comply with work safety regulations.

Camera platforms above spectator areas should be fitted with kick boards and drop-nets to prevent any items accidentally falling to the spectator area.

2.2.6 Field Cameras

A portable cabled camera is used on-field before play for wicket reports, toss and interviews, and post match for interviews and presentations. TV broadcasters may opt to use wireless cameras for this service.

2.2.7 Presentation Area

An area convenient to the player's dressing rooms is required for post match presentation and interview purposes. Nominal space requirement is 3.5m x 3.5m with provision for erection of backdrop, camera placement with power and fittings for temporary TV lighting installations.

2.2.8 Hawk-Eye Cameras

6 unmanned fixed cameras are installed around the ground, preferably at grandstand roof height, on stable mountings. Computer processing of the camera images generates a point of view from any angle within the field of (6x) camera coverage. Access is required for installation for at least 2 days prior to the match. Permanent install of camera fixing points may be negotiated with venue managements. Access to the camera mounting points needs to comply with relevant state and federal work safety regulations.

2.2.9 Strike Zone cameras

2 unmanned fixed cameras are located on the main camera platforms and are aligned plumb on centre line of the wicket in play. Computer processing of the camera images allows accurate display of lbw situations.

2.2.10 Run Out cameras

4x unmanned cameras are located at a minimum of 6 metres relative height, nominally 20 metres back from the perimeter, aligned with the "popping crease" at each end from both eastern and western sides. Slo-mo replays ex the run out cameras provides for accurate determination of run outs by the video umpire ("third umpire"). Access is required for installation at least 2 days prior to play. Permanent install of fixing points may be negotiated with venue managements. Access to camera mounting points need to comply with relevant state and federal work safety regulations.

2.2.11 Stump cameras

Special stumps have been developed which house a "lipstick" camera to give a point of view camera angle from the stumps. These cameras connect to a power supply unit via an "umbilical" cable. The power supply is cut into the turf behind the wicket in play just beyond the wicket block and the cable is cut into the rolled turf behind the stump to the power supply.

Camera signals are backhauled to the control OB unit via underground miniature microwave link. Microwave transmission is in the 10 GHz band, and any possible usage of the band within the venue by non TV broadcasters needs to be coordinated by venue management and TV broadcasters to ensure interference free operations.

A suitable microwave receive location is required to achieve best possible line of sight to the stumps with minimal player obstruction of the line of sight. Receiver positions are generally high on grandstand roofs. Access to receiver locations need to comply with work safe regulations.

Stump Microphones are installed along with stump cameras, and cabled backhaul is the preferred option. Where RF transmission is the only option, transmissions are in the 900 MHz wireless microphone band.

Wireless microphone frequency co-ordination is required between venue management and TV and radio broadcasters and any other legitimate users of wireless microphones at the venue to ensure interference free operations.

2.2.12 Final Camera Placement

The above camera positions are typical for first class and international one day cricket coverage but final camera placement will always be at the prerogative of the programme producer and director.

2.3 Commentary Boxes

2.3.1 Commentary Box Position

The main TV commentary box should ideally be behind and above the main camera platform at either the north or south end subject to the OB van site, and able to accommodate 4 x commentators, TV producer, and Associate Producer, Statistician and computer graphics operators. It is normal practice to have as many as twelve personnel working in a cricket commentary box at any given time.

2.3.2 Commentary Box Dimensions

Typical size for the main commentary box is in the order of 8 metres frontage x 4 metres deep.

2.3.3 Studio

A TV Studio area is required adjacent to the TV commentary box for hosting of the TV program. Typical dimensions for TV studio are 6metres x 6metres preferably with 3.6metres (minimum) ceiling height and (background) view to the field of play.

The commentary box / studio area needs to be air conditioned with capacity to cope with up to a 12 person heat load plus studio lighting load. Evaporator fans need to be low noise units (Not to exceed NR 35) with local control for optional shut down during studio on air segments.

Lighting Bars are to be installed in the studio / on camera area for mounting of TV lights. Location and load capacity of the bars is to be decided in consultation between venue management and TV Technical representatives.

A 30 Ampere three phase interconnect cable is required from the OB compound for lighting power.

2.3.4 Unilateral Commentary Box

International Cricket series generally involve overseas broadcasters in addition to the local (host) broadcaster. The overseas broadcasters take the general coverage of play produced by the host broadcaster but require “Unilateral” camera and commentary facilities to produce a coverage tailored to their specific viewing audience.

Unilateral broadcasters typically request commentary and studio facilities similar in scope to host broadcaster provisions.

The unilateral commentary box should be sited similarly to the main TV Commentary Box, similarly equipped and fitted out.

Dimensions for the unilateral commentary box are in the order of 4 metres x 4 metres.

Additional space is required in the OB van compound to accommodate OB facilities for international broadcasters.

2.3.5 Radio Commentary Boxes

Provision needs to be made for Radio broadcast boxes adjacent to the TV box area.

Nominal area for a Radio box is 3.5m x 3.5m with clear sight line to the field of play and to the main scoreboard.

Coax, Telco and screened audio cables need to be installed between the TV OB area and radio commentary boxes to provide for video replays, sound splits and communications circuits between radio and TV services.

2.3.6 Arena lights

Arena lights should remain ON following end of play until end of telecast as the field of play is the hostings backdrop. Arena lights should be switched to training level following the telecast until “bump out” is completed for crew safety.

2.3.7 Wireless Microphones

Wireless microphones are extensively used for umpire calls and TV / radio interviewers. Wireless mic frequency co-ordination is required on a venue by venue basis to avoid interference with TV operations, radio broadcasters, umpires and linesmen, ground announcers, entertainment, and other legitimate users of wireless microphone equipment.

2.3.8 Radio Frequency (RF) Spectrum Management

Extensive use of the RF spectrum is necessary for comprehensive TVOB cover of International First Class and One Day Cricket.

Allocation of frequency bands is generally as follows:

- 2.5 GHz microwave band: Portable wireless cameras
In-car camera uplinks
Relay helicopter down links
Camera helicopter down links
- 7 / 8 GHz microwave band Medium haul point to point back haul links
- 13 GHz microwave band Short haul point to point back haul and local interconnect links
- 470 – 520 MHz band Duplex Radio Telephone (RT) voice communications
- 520 – 820 MHz band Telemetry and data communications
- 520 – 820 MHz band Wireless microphone operations
- Aggregate RF systems requirements can be in the order of 12 x 2.5 GHz channels, 4 to 6 x 7 / 8 GHz channels, 4 to 6 x 13 GHz channels
- 10 x UHF duplex RT frequencies and 4 to 6 x wireless microphone frequencies

RF spectrum usage is strictly controlled, and specific channel allocations are generally licensed to individual commercial entities. Temporary use of multiple frequencies as is required for operations on the major event scale require frequency co-ordination with established license holders and special licensing for the complete RF requirements for the period of the event.

It is essential that a rigid frequency management procedure be implemented on a venue by venue basis to ensure non interference between services within the precinct involved in TVOB origination, including authorised unilateral operators, and for other licensed users (ENG etc.) operating in near proximity to the OB precinct.

Wireless microphone frequency management is the prerogative of the event promoter and venue management, but TVOB operators need to be fully involved in channel allocations from the early planning stage of the project.

Microwave and UHF frequencies are licensed but may be subject to frequency sharing arrangements. Co-ordination between users, including news services not directly involved in the event telecast, but licensed to operate in proximity of the event precinct is an essential pre-requisite for event RF spectrum planning.

Major events involving multiple operators of RF services require overall coordination to be under statutory authority control of use / misuse of RF spectrum assets.

3. OUTSIDE BROADCAST COMPOUND

3.1 General

A level hardstand area for outside broadcast control units (OB Units) parking is required convenient to the camera platform/ TV commentary box area.

The OB van compound should be fenced off from public access for security of TV operations, and for public safety.

Major outside broadcast vehicles are semi trailer units built to Australian road transport regulations. Venue vehicle access and load bearing capacity needs to comply with maximum vehicle dimension and weight specifications. Typical requirements are 17.5 metres combined trailer and prime mover length, maximum height of 4.3 metres, and 8.5 tonne per axle loading.

Typical hardstand area is in the order of 500 square metres either 25 metres x 20 metres or 50 metres x 10 metres, rectangular.

Access to and egress from the OB compound needs to cater for the turning circle and overhead clearance requirements of maximum dimension articulated vehicles.

Special attention to overhead obstructions is necessary where ramps or uneven road surfaces are involved.

Generator hardstand should be incorporated in the OB compound (see below).

Provision is to be made to site a satellite uplink vehicle within the compound, or adjacent to the compound with clear line of sight to the North-East sky.

An additional area of nominal 300 square metres should be available for international unilateral operators.

3.2 Personnel Amenities

Adequate personnel services need to be provided in the OB compound. These amenities should include:

- Toilet facilities, separate male and female facilities

- Sewer or self contained connection, town water connection
- Drainage contours such as to minimise “ponding” during heavy rainfalls
- Food preparation area and catering area
- First Aid facility
- Regular cleaning and rubbish removal services

4. POWER

4.1 Typical Requirements

Typical power requirement is for 150 Ampere per phase three phase supply adjacent to the outside broadcast vehicles hardstand area. Power should be available over 4x three phase outlets or via ‘Power-lock’ bulk connectors. Industry standard power connections are Cutler Hammer DS63 outlets, Wilco 5 pin 3 phase (40 amp/50 amp) connectors and outlets, and / or “Power Lock” bulk supply connectors.

4.2 Heavy Neutral Currents

The high level of use of switch mode power supplies in TVOB technical equipment has resulted in high neutral current drain in three phase mains supplies. High current neutral connections should be specified for mains power installations planned for TVOB compounds.

4.3 Circuit Breakers and Safety

Where mains power supplies are protected by residual current devices (RCDs) trip current of the source RCD should be adjustable, to be set to a higher trip current level than the main OB van circuit breaker, such that the OB van main circuit breaker serves as the prime safety switch for the TVOB operation.

TVOB mains supplies are to be separately protected from other electrical supplies servicing the entertainment venue.

Power reticulation ex the OB van to operational areas is to be RCD protected in accordance with Work Safety requirements.

4.4 Local and Standby Emergency Generators

Generator hardstand should be incorporated in the OB compound and should be adjacent to the mains power connect point.

Sourcing of generators is a TVOB responsibility. Generators are to be silenced to EPA requirements and are to be sited to obviate exhaust fume exposure to TVOB staff and patrons.

Where generator hardstand cannot be within the OB van compound interconnect cabling specified to full electrical load (150 Amps / phase, three phase) is required to be installed between the generator site and the OB Compound.

Three phase 30 Ampere rated interconnect cables (Wilco 5 pin connectors) are to be installed between the OB Compound and Commentary box / Studio area, and between the OB Compound and sideline for extension of OB van power to main operational areas.

5. AUDIO / VIDEO (A/V) CONNECTIVITY

5.1 General

TV program material may be required to be fed to and occasionally returned from other locations. Full quality feeds from the OB unit to another location such as a broadcast station should be over a "Contribution" quality circuit.

Both Standard Definition (SD) and High Definition (HD) picture formats are now expected to be in 16x9 wide screen. For SD, the preferable video connection is component serial digital video (SDI) with at least stereo audio. The alternative for SD and necessary for HD are digital link connections that use MPEG compression systems. However, the degree and type of compression, and as a consequence, the quality loss on such "contribution" circuits, need to be pre-confirmed. In certain circumstances if no other connection is possible, if agreed, an analog video link may be used for SD program material.

Audio requirements may include enhancements such as "Pro-logic" surround stereo encoding or discrete multichannel surround (eg. 5.1 surround). Multichannel audio may be carried in digital AES/EBU circuits in "Dolby-E" format. Additional audio channels may be required if separate music and/or effects channels are required.

In all cases, care is required to ensure that picture-sound delay offsets (lip-sync) are within limits.

5.2 Venue Audio / Video (A/V) Connections

The connect panel for venue A/V services should be located in the OB compound, co sited with TVOB cable terminations and Telco services.

TV signals emanating from the OB unit will generally be 16x9 wide screen digital video, and at least stereo audio.

The venue A/V service provider would need to provide a format converter for reticulation to any 4x3 in house monitors.

Interface connectors for off-air TV distribution, venue A/V distribution, Foxtel cable and venue phone should be available at the connect panel.

(Refer to Addendum # 1 Cable Installations).

6. CABLING

6.1 General

Simple access is required for cabling from the outside broadcast vehicle hardstand to the main camera platform, roof camera platform, main commentary box, unilateral commentary box, on camera position and field, and to all other operations areas, and to the nominated post match presentation area.

TV cable installations are site specific and need to be planned on an individual basis, but provision needs to be made for cable routes which provide ease of access, do not compromise venue aesthetics and do not present risk to workers or public.

Cable routes within the venue should allow for obstacle free installation and removal of cables.

Wherever possible, ground level cable paths clear of public traffic areas are preferred.

As a general rule provision for day cabling allows for full cable install within a 20 man hour rig time, and de-rig within 12 man hours.

Where this cannot be achieved due to either stadium access problems or to the scale of the OB operation, installation of "SEASON CABLING" is a preferred option.

Cable conduits are not recommended for temporary cable installs, but where there is no other option conduits should be a minimum 150mm diameter with draw wire installed. A minimum of 3x conduits should be available in order to separate signal cables from power cables, and to allow for (inevitable) future expansion.

6.2 Permanent Cable Install

Cable routes in major stadium complexes may be such as to preclude both DAY and SEASON cable installs.

In such cases permanent installations become the only option.

It should be recognised that TV production techniques change, particularly with equipment innovations, and that cable installations are subjected to continuing upgrades.

Implementation of HDTV equipment is impacting on cable installation with increased demand for Fibre optic camera cables, precision digital video coaxial cable, and (multi way) fibre optic cables for utility use.

Co-axial video cable is to be specified for end to end delivery of uncompressed digital video over the installed length of cable.

Cable types and cable technical specifications alter with advances in technology so cable schedules need to be updated prior to planning any permanent installation.

Permanent cable installations should be planned in consultation with venue management and TV Rights holders, with emphasis on specifications for cables, connectors and locations of outlets.

For multi-purpose venues, the total installation should encompass the highest common requirements of all possible event cabling.

Provision needs to be made for replacement and upgrade of such installations.

Preference is for cantilevered cable trays exclusive to TV cabling. Conduits – if provided – should be free of turns no less than 120 degrees from any change of direction. Where conduits are the only option, 150mm diameter is the minimum specification, and multiple conduits should be available to all operations areas with provision for upgrade and expansion.

(See Addendum #1 TVOB Cable Installation requirements for International Cricket venues)

7. BACKHAUL

7.1 General

TVOB transmission to studio base can be via Telco circuits, satellite uplink or local microwave radio transmission.

The Telco access point should be adjacent to the OB compound.

Space provision for a satellite uplink vehicle with clear view to North-East sky is required within or adjacent to the OB compound.

7.2 Microwave Link Platform

A 2.0 m x 2.0 m platform is typically required for TVOB backhaul microwave link installation.

The platform is to be sited to allow clear line of sight radio transmission to the TV studios or to a suitable intermediate relay site.

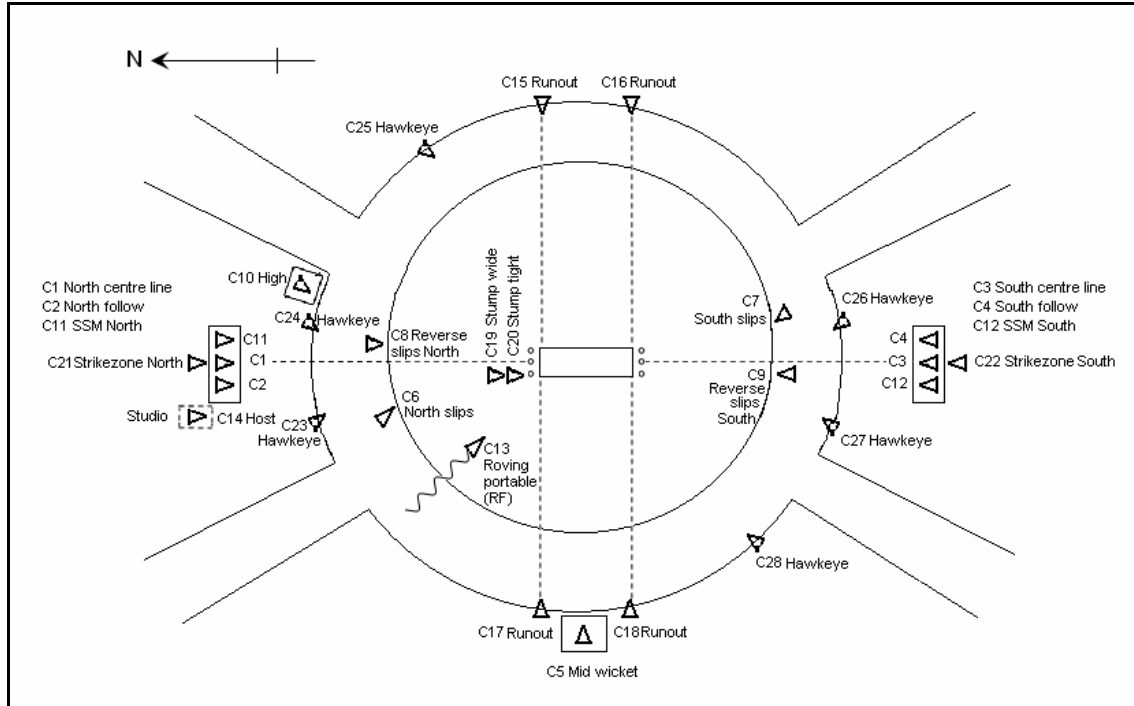
A microwave platform may also be required within the stadium for mounting of (manned or unmanned) wireless camera microwave receivers.

The provision of microwave link platforms at the stadium will depend on the surrounding topography and available link paths in and out of the stadium.

Any structures need to comply with relevant Occupational Health & Safety (OH&S) regulations.

8. OUTLINE TECHNICAL PLAN FOR CRICKET COVERAGE

Figure 1 Nominal camera positions



FREE TV AUSTRALIA OPERATIONAL PRACTICE OP – 35

TV COVERAGE PLAN FOR INTERNATIONAL FIRST CLASS AND ONE DAY CRICKET

Issue 3
June 2007
Page 13 of 17

8.1 Camera Configuration

Cam 1	Nth centre line	Studio/OB camera	55:1 zoom
Cam 2	Nth follow	Studio/OB camera	55:1 zoom
Cam 3	Sth centre line	Studio/OB camera	55:1 zoom
Cam 4	Sth follow	Studio/OB camera	55:1 zoom
Cam 5	Mid wicket	Studio/OB camera	55:1 zoom
Cam 6	Nth slips	Studio/OB camera	70:1 zoom
Cam 7	Sth slips	Studio/OB camera	70:1 zoom
Cam 8	Nth reverse slips	SLSM camera	70:1 zoom
Cam 9	Sth reverse slips	SLSM camera	70:1 zoom
Cam 10	High	Studio/OB camera	55:1 zoom
Cam 11	Super slo mo Nth	Super slo mo camera	70:1 zoom
Cam 12	Super slo mo South	Super slo mo camera	70:1 zoom
Cam 13	On-field portable	Portable (RF) camera	20:1 zoom
Cam 14	Studio	Portable camera	20:1 zoom
Cam 15	Run out N/E	Portable camera	18:1 zoom
Cam 16	Run out S/E	Portable camera	18:1 zoom
Cam 17	Run out_N/W	Portable camera	18:1 zoom
Cam 18	Run out S/W	Portable camera	18:1 zoom
Cam 19	Stump camera	Special camera	
Cam 20	Stump camera	Special camera	
Cam 21	Strike zone Nth	portable camera	20:1 zoom
Cam 22	Strike Zone Sth	portable camera	20:1 zoom
Cam 23-28	Hawk Eye	Proprietary system	

9. LIGHTING

(Reference should be made to FREE TV AUSTRALIA OP 31: *Lighting Requirements for Colour Television.*)

9.1 International Standard for Colour TV Lighting at Venues

Design criteria for development projects should meet an international standard with mechanical and electrical specifications to provide for upgrade to (future) HDTV standards.

Lighting level (EV) toward cameras	1400 lux
Colour temperature (TK)	4000 Kelvin to 5600 Kelvin within 500 Kelvin at individual venues
Colour rendering index (Ra)	90

9.2 Local Standards

Existing stadiums that do not meet international standards are classified as follows:

9.2.1 Professional Standard (Minimum standard for TV cover)

EV toward cameras	1000 lux
Colour temperature	As above
Colour rendering index (Ra)	Minimum 65, > 90 preferred

Whilst satisfactory picture quality can be achieved at the minimum lighting levels stated (1000 lux), restrictions are placed on full usage of tele zoom lenses and focusing becomes quite difficult for camera operators on BCU (big close up) camera angles. Super Slo Mo cameras cannot perform satisfactorily below PROFESSIONAL standard lighting.

10. SAFETY

All personnel working on TVOBs are to be familiar with and to comply with relevant OH&S regulations.

A site specific risk assessment is to be undertaken by venue management and TVOB operations management during planning stages of the event.

TVOB personnel are to be inducted as to venue and TVOB safety requirements prior to commencement of duties.

Scaffolding, camera tracks, aerial cabling and other constructions are to be installed by suitably licensed persons.

Camera cranes, scissor lifts, fork lifts and other mobile work platforms are to be operated by licensed persons.

Electrical installations are to be undertaken by licensed persons, and tested and tagged in compliance with statutory regulations.

Temporary TV cable installations are to comply with site hazard reduction policies.

As safety regulations can vary subject to individual state government regulations, applicable requirements need to be determined on a site by site basis.

ADDENDUM # 1

CABLE INSTALLATIONS AT INTERNATIONAL CRICKET VENUES

NOTE:

- Implementation of HDTV equipment is impacting on cable installation with increased demand for Fibre optic camera cables, precision digital video coaxial cable, and (multi way) fibre optic cables for utility use.
- Co-axial video cable is to be specified for end to end delivery of uncompressed digital video over the installed length of cable.

The following cable listings are typical of requirements for International First Class and One Day Cricket telecasts but intended only for guideline reference. Cable types and cable technical specifications alter with advances in technology so cable schedules need to be updated prior to planning any permanent installation.

Permanent cable installations should be planned in consultation with venue management and TV Rights holders, with emphasis on specifications for cables, connectors and locations of outlets.

Outside Broadcast compound to Main Camera Platform NORTH

3x Fibre optic camera cables
4 x triaxial¹ camera cables
2 x coaxial video
1x single phase power

Outside Broadcast compound to Main Camera Platform SOUTH

3x Fibre optic camera cables
4 x triaxial¹ camera cables
2 x coaxial video
1x single phase power

Outside Broadcast compound to Roof Camera Platform

1x Fibre optic camera cable
1 x triaxial¹ camera
5 x shielded audio

Outside Broadcast compound to TV Commentary Box Number 1

2 x triaxial¹ camera

¹ Installed Triax cables are to be 11mm or 14mm diameter as required to meet HDTV performance requirements over the installed length of the cable (including any “day cable” extensions to the installed cable. Maximum working lengths are 1000 metres for 14mm cable and 500 metres for 11mm cable

FREE TV AUSTRALIA OPERATIONAL PRACTICE OP – 35

TV COVERAGE PLAN FOR INTERNATIONAL FIRST CLASS AND ONE DAY CRICKET

Issue 3
June 2007
Page 16 of 17

6 x digital coaxial video
2x 12 way audio multi-mic cable (typical suppliers, Burndy, Gepco)
1 x 20 pair Telco (Audio)
1 x 20 pair Telco (Data)
1 x 30 Amp per phase three phase Wilco 5 pin power interconnect cable
4x CAT 6 computer cable
1x 8 way multi Fibre optic cable.

Outside Broadcast compound to Unilateral Commentary Box

1 x triaxial² camera
4 x digital coaxial video
1x 12 way audio multi-mic cable (typical suppliers, Burndy, Gepco)
1 x 20 pair Telco (Audio)
1 x 20 pair Telco (Data)
1 x single phase power interconnect cable
2x CAT 6 computer cable

Outside Broadcast compound to Field (Players Race)

For extension to perimeter camera positions
6x Fibre optic camera cable
6 x triaxial² camera cable
4 x coaxial video
2x 12 way audio multi-mic cables
1 x 20 pair Telco (Audio)
1 x 20 pair Telco (Data)
1 x 30 Amp per phase three phase Wilco 5 pin power interconnect cable
2 x Cat 6 computer cable

Outside Broadcast compound to Dressing Room(s)

TV cabling is required to each player activity area of both “home” and “visitors” dressing room as follows:

1 x triaxial² camera
1 or 2 coax (subject to layout)
1x single phase power interconnect cable
2x CAT 6 computer cable
4 x screened audio cable

² Installed Triax cables are to be 11mm or 14mm diameter as required to meet HDTV performance requirements over the installed length of the cable (including any “day cable” extensions to the installed cable. Maximum working lengths are 1000 metres for 14mm cable and 500 metres for 11mm cable

FREE TV AUSTRALIA OPERATIONAL PRACTICE OP – 35

TV COVERAGE PLAN FOR INTERNATIONAL FIRST CLASS AND ONE DAY CRICKET

Issue 3
June 2007
Page 17 of 17

Outside Broadcast compound to “Stumpcam” Microwave Platform

- 2 x Microwave Triax
- 1x Single phase power interconnect cable
- 2x RF coax
- 2x digital coax video
- 4x audio
- 2 x Cat 6 computer cable

Outside Broadcast compound to VIDEO REF (THIRD UMPIRE)

- 2 x digital coax video
- 5 pair Telco cable
- 2x audio cables
- 2x Cat 6 computer cable.

Outside Broadcast compound to Backhaul microwave platform

- 2 x Microwave Triax
- 1x Single phase power (to connect to OB Van)
- 2x RF coax
- 2x digital coax video
- 4x screened audio
- 2 x Cat 6 computer cable